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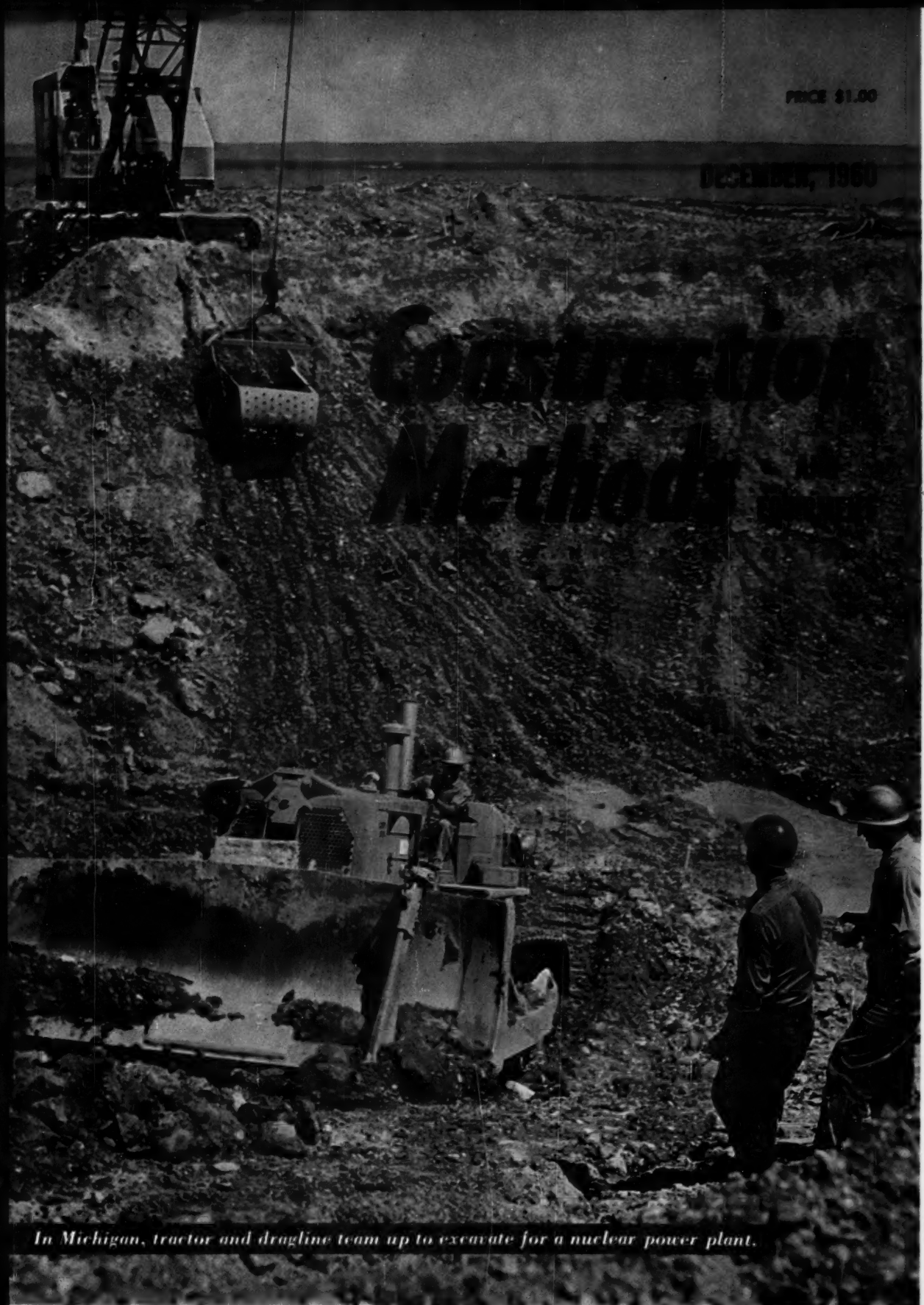
DECEMBER, 1960

Contour Method



In Michigan, tractor and dragline team up to excavate for a nuclear power plant.

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Builders of the world's largest drydock *standardize on Yellow Strand*

Almost every conceivable excavation technique is in evidence as the world's largest drydock begins to take shape at Puget Sound Naval Base: conveyors, draglines, bulldozers, and even a sluicing system patterned after the Placer Mining done in Alaska.

And wherever you see earthmoving operations, you'll find Broderick & Bascom Yellow Strand Wire Rope! The joint venture contracting firms of Manson, Jones, Perini and Osberg have standardized on Yellow Strand at this job. One dependable wire rope—one dependable source is important as they race the clock.

And before this mammoth undertaking is completed, Yellow Strand will have played a significant role in dredging out 630,942 cubic yards of dirt, constructing gravel fill coffer dams containing 1,300,000 cubic yards of sand and gravel, and pouring nearly 185,000 cubic yards of concrete.

When this giant repair berth is completed, it will be 1180′ long, 180′ wide and 61′ deep and hold 96 million gallons of water.

On large or small projects, you can depend upon Yellow Strand Wire Rope. Get your supply at your nearest local distributor—it is always on hand. *Broderick & Bascom Rope Co., 4203 Union Boulevard, St. Louis 15, Missouri.*

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WIRE ROPE

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We make a full line of sizes.
Machine, and carriage bolts also.
And they're all top quality.

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Richmond Rocket Insert
Kohler Threaded Insert by Richmond

The variety of types and sizes of Richmond Concrete Inserts gives you the added assurance of always having the right tool for any hanging or anchoring job. These products are laboratory tested and you can rely on their recommended working loads. They are provided with either holes or lugs which makes nailing them to the forms a simple, speedy operation.

Send for your free copy of Richmond Bulletin No. 6 giving you complete data on types, sizes, working loads and varied uses of Richmond's expanded line of Concrete Inserts... and, if you have a specific concreting problem, let Richmond's Technical Department help you. Write to:

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Construction Methods AND EQUIPMENT

DECEMBER, 1960

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On-the-job performance records prove that trucks equipped with Eaton 2-Speed Axles make quicker trips, travel more miles at lower cost per mile. By providing *double* the conventional number of gear ratios—the right gear ratio for every road and load—they reduce stress and wear on engine and power transmitting parts; permit engines to run efficiently under all operating conditions.

Eaton's exclusive features, including forced-flow lubrication, planetary gearing, and Inductalloy Axle Shafts, add thousands of miles to axle life, and eliminate costly maintenance expense worries.

Ask your dealer to explain how Eaton 2-Speed Axles reduce hauling costs, add to profits, and make trucks worth more on the trade-in.

EATON
2-SPEED
AXLES

More than 2 Million Eaton Axles in Trucks Today

EATON

AXLE DIVISION
MANUFACTURING COMPANY
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Circle 3 on Reader Service Card

ON THE COVER

A Caterpillar D9 rips material for removal with a 2-yd P&H dragline in reactor pit area of Michigan's Big Rock Point nuclear power plant. Rogers dozer-mounted ripper helps meet close tolerances in tough beach rock and glacial till. Hodgkiss & Douma of Petosky, Mich., is subcontractor for the 29-ft-deep, 134-ft-wide excavation that will be the site of a 130-ft-dia steel sphere containing the plant's nuclear reactor. Bechtel Corp. is prime contractor for the $27.7-million atomic power plant.

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NEXT MONTH

A forecast of 1961 business by type of construction, an analysis of next year's labor prospects, and a round-up of new developments in equipment, materials and techniques are features of "Blueprint for '61." This special report will highlight those factors that will determine the course of the industry next year.

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DECEMBER, 1960

Pay Dirt in This Issue

Shaped Earth Serves As Casting Bed for Roof . . 56

Corrugated concrete arches for an ice arena are cast in two halves in pits dug in the arena's parking lot. The half-arch panels are cast pancake fashion in four stacks.

Unusual Spread Moves Million Yards of Borrow . . 62

Lack of good borrow material forces a contractor to dig down below the water table. To get the sand out, the pit is dewatered by pumps and a dragline helps load the scrapers.

Large Open Cofferdam Speeds Bridge Project 82

A strut-free circular cofferdam that provides clear working space for building the river piers has put a Nashville bridge builder nearly 12 mo ahead of schedule.

Drill Helps Sink Sand Drain in Sawdust 59

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How to Simplify a Sewer Job 78

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Large Precast Panels Speed Factory Job 105

NO OTHER BOOM HOIST EQUIPMENT LIKE THIS!

Another of the many Northwest Crane features that get the job done!

Compare it with *any other!* Watch it work! Northwest Independent High Speed Boom Hoists are the ultimate in a boom hoist that is precise, fast and durable. It is a complete unit and is specifically designed for crane work where constant booming is a requirement. It is not an adaptation or modification of the ordinary spur gear type boom hoist. It is independent in operation of all other machine functions. The boom can be raised or lowered with or without a load on the main hoist line and it is power controlled both up and down. Here is a unit that is unique for its high capacity for continuous operation under maximum load without overheating or fading. It is the answer to erection work and concrete bucket handling where the boom angle must be changed every cycle.

Here is another of the many Northwest features that get the job done—one of the dependable assemblies that earn a profit and make it possible for you to say, "That Northwest is always ready to go." They are the things that make the Northwest the finest machine of its kind. Get into the details of equipment before you buy. Look and compare! A Northwest man is always ready to help you.

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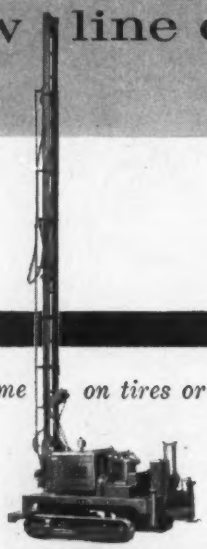
ANNOUNCING LE ROI'S

A new line of powerful . . . highly portable . . .



These rigs come on tires or tracks!

THE LRD-2

Here's a highly portable blasthole drill for making hole up to 4½ inches as deep as 30 feet . . . equipped for either positive-drive rotary drilling or powerful down-the-hole percussive drilling.

What's more, the LRD-2 is completely self-contained . . . and economically priced, too!

The entire unit is easily handled by one man. Controls are conveniently grouped at an operator's station located alongside the drilling area. The unit can be moved, leveling jacks hydraulically set, boom hydraulically raised, drill pipe and bits connected, and hole started — all with a few non-fatiguing motions.

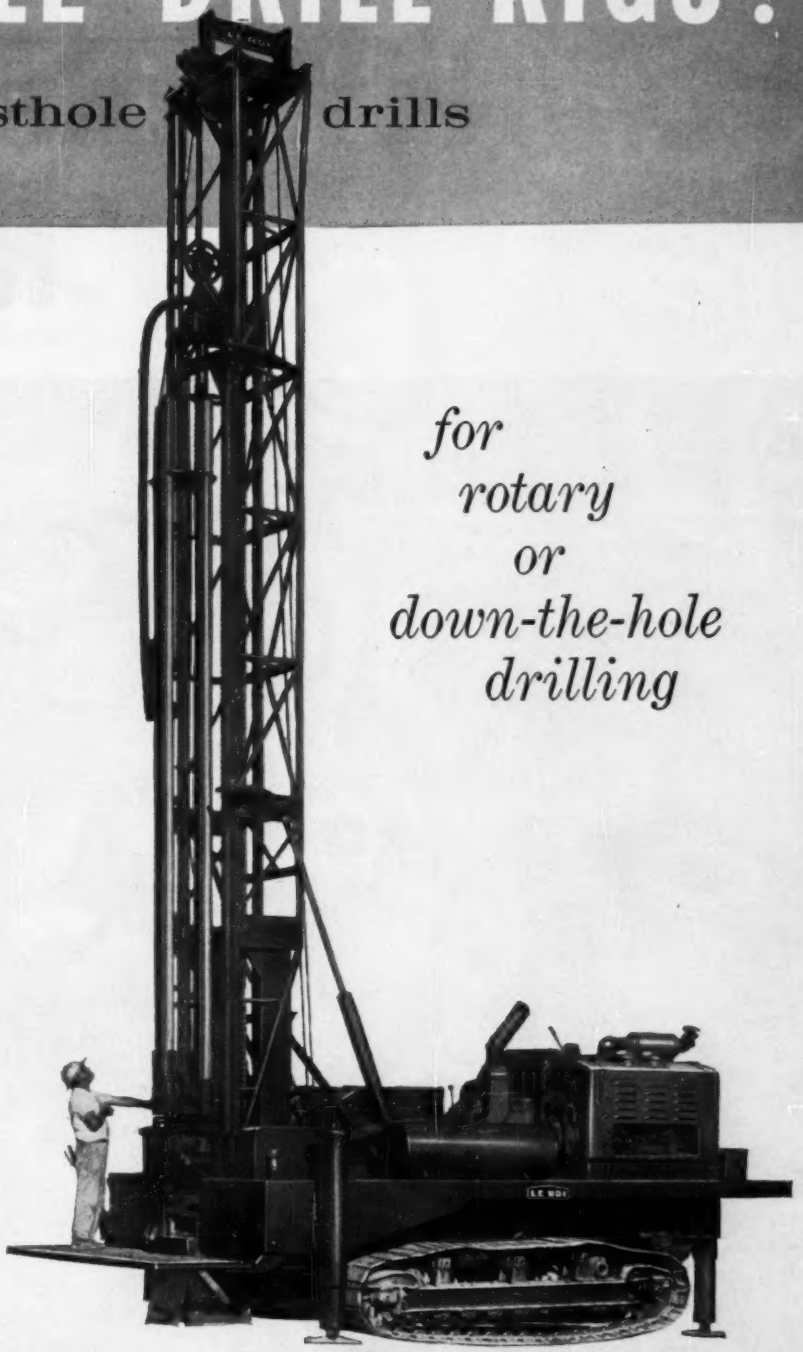
Powerful direct mechanical drive keeps the rotary table turning — won't bog down or lose torque under rough going like air or hydraulic driven units — eats through tough rock formations under 10,000 lbs. pulldown pressure at speeds from 40 to 250 rpm. If necessary, a hard-hitting down-the-hole drill can quickly be substituted for the rotary bit to drill extremely hard rock formations. A Le Roi 25 hp two-stage air compressor provides ample air for powering the down-the-hole drill and cleaning out hole . . . or is available in single-stage where only rotary drilling is necessary.

The self-propelled LRD-2 is available either on crawler or tire mounting and with either gasoline or diesel power unit. A whole list of extra equipment is available to ease or speed drilling, including lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, etc. . . . all detailed in Specification Sheet AT-146. Write for your copy.

◀ *Circle 5 on Reader Service Card*

DEEPHOLE DRILL RIGS!

rotary blasthole drills



for rotary or down-the-hole drilling

THE LRD-3

Here's the *big* rig . . . completely self-contained for putting down hole as large as 7⅞ in. to 100 ft. depth!

The LRD-3 is available with either crawler or truck mounting. An enclosed cab can be furnished to provide all-weather protection for the operator while drilling. All controls are conveniently grouped for easy operation and good visibility.

The traveling head design of the LRD-3 provides positive mechanical power without excessive torque loss under heavy pulldown, and permits easy control in making up and breaking down drill-rod. Every function of the unit is designed to speed productive drilling and keep the operator making hole. Leveling, raising the mast, and even the automatic drill pipe magazine are hydraulically controlled for speedy operation. A powerful dust collector traps cuttings and blows them well away from the unit.

An extra-sturdy 4-speed chain-hydraulic pulldown puts up to 30,000 lbs. of pressure on the bit of the LRD-3. A rugged dual-range transmission provides rotary speeds from 9 to 168 rpm in a selection of 10 forward and 2 reverse speeds.

Where needed, the rotary bit can be quickly changed for a powerful down-the-hole drill. A Le Roi 100 hp dual-manifold air compressor provides plenty of 100 psi air for punching through tough rock with the down-the-hole drill, or it can be set to deliver 625 cfm of 40 psi air for fast, efficient removal of cuttings in rotary operation.

The LRD-3 comes complete with a hydraulically operated magazine with capacity for four 20 ft. drill pipes, and can be equipped with optional convenience equipment similar to the LRD-2. Specification Sheet AT-147 describes the unit in detail, with complete spec information. Send for a copy.

LE ROI

division of Westinghouse Air Brake Co.

Sidney, Ohio

Circle 7 on Reader Service Card

MILE-HIGH CALIFORNIA ROAD JOB

NEW TRACTOR-REALLY

Packs it in—two D8H Tractors, pulling and pushing, fill a 491 Scraper with hard-to-load breccia, a cemented gravel, in 45 seconds.

SCRAPER TEAMS PRODUCE

"A GOOD COMBINATION FOR THE ROUGHEST WORK"

TAKE boulders, volcanic ash and mud—mix well with decomposed shale—then add mile-high working altitudes, side-hill operation and unfavorable weather . . . these are some of the problems facing A. Tiechert and Son Inc. as they push a new highway through the Sierra Nevada Mountains in Eastern California. The job, 7.8 miles of freeway construction on State Highway 40, involves moving two million yards of earth in two five-month seasons. In spite of the obstacles, the Sacramento contractor holds the work to schedule, expects to complete the job on time this October.

Four D8 Series H Tractor-491 Scraper teams, push-loaded by D8s of the same series, set the pace for this difficult job. Because of the steep hill haul roads, they start the cuts and fills, then handle earthmoving on hauls up to 700 feet. DW21 wheel units take over on the longer hauls that range up to 7000 feet.

"The 491 Scrapers with D8s front and rear performed very well—especially in wet, rocky ground," says W. W. Staring, Project Manager. And he adds, "Operators and foremen especially like the 491 in rock because of higher apron clearance, excellent ground clearance and the good distance from axle to apron. In most cases we used D8-491 teams instead of shovels on shot breccia. It's a good combination for the roughest work."

On rugged big volume, short haul operations like this, Caterpillar track-type Tractor-Scraper combinations are the most efficient way to move earth. The new D8 Series H, for example, is over two tons heftier than the previous model, packs 23% more horsepower (235 flywheel HP), and with direct drive has a speed of 6.3 MPH forward. Team it with the 491 Scraper (34 cu. yd. heaped, 27 cu. yd. struck) or the 463 Scraper (28 cu. yd. heaped, 22 cu. yd. struck) for big capacity loads.

The finished product—traffic moves with speed and safety over a newly completed section of California State Highway 40.

Get all the facts—plus a profit-proving demonstration—on the new Caterpillar D8H Tractor and the 491 Scraper from your Caterpillar Dealer. He's ready right now!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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BORN OF RESEARCH
PROVED IN THE FIELD

Circle 9 on Reader Service Card

LUBE LOGIC Five ways to

Now's the time for battery check-ups

With cold weather ahead, your batteries will soon work harder than ever. Here's how you can help make sure they're up to it:

Inspection

- Inspect battery case for cracks and leaks. See that vents in cell caps are open.
- Check battery posts and cable clamps for looseness, breakage or corrosion.
- Using distilled water, bring electrolyte in each cell up to level indicated in cell opening.

Hydrometer test for specific gravity

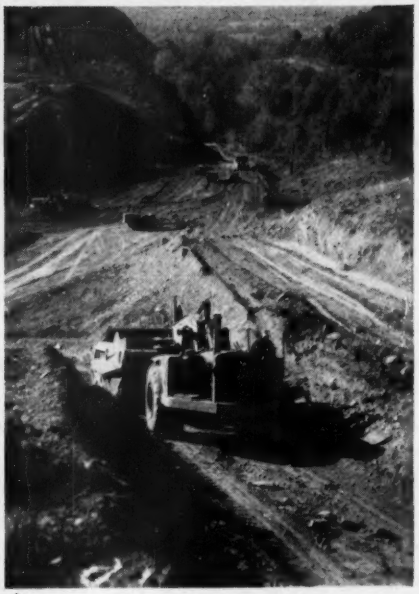
- Use a temperature-corrected hydrometer to test the state of battery charge. Make sure battery has not been recently fast-charged, nor water added.
- Draw enough fluid from each cell to raise float off the bottom of the hydrometer tube. Holding hydrometer straight up-and-down, take eye-level reading of the neck of the float. Repeat for each cell.
- Note the temperature, and correct hydrometer reading by subtracting 0.004 from the reading for each 10°F. below 80°F. (Example: If hydrometer reads 1.280, and temperature is 70°F., corrected reading would be 1.280 – 0.004 or 1.276.

Normal state of charge for 12-volt battery is 1.260 to 1.280 specific gravity. For a 6-volt battery, 1.265 to 1.290 specific gravity.

LEADING CONTRACTORS—EVERYWHERE—RELY ON TEXACO LUBRICATION

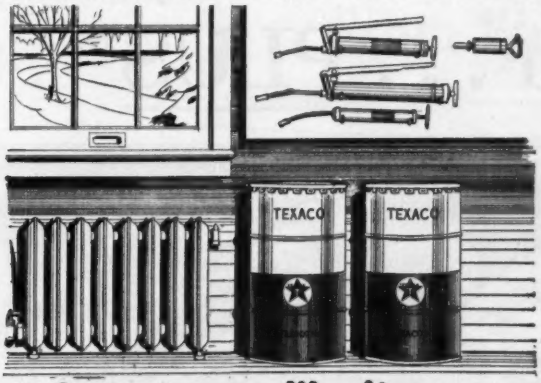
▲ **Isbell Construction Company** bulldozers remove reefs from river channel on Truckee River Flood Control project near Sparks, Nev. Isbell heartily endorses Texaco's Simplified Lubrication Plan.

◀ **Interstate Highway 80 Project** at Colfax, Iowa. Texaco Engineer E. A. Rolwes (right) works closely with Mott Construction Company on the important assignment of keeping equipment on the job and maintenance costs low.



▲ **Ledbetter-Johnson** gouges out largest rock cut (306 ft.) east of Rockies in highway project near Dalton, Ga. This company uses Texaco lubricants to keep their equipment on the job . . . their costs down.

ease winter maintenance



Grease guns like it warm

Store grease guns this way, properly racked to avoid damage, and they'll give you much better service. Incidentally, lubricants like to be stored warm, too.

Warm up the guns if they're too cold to pump the lubricant. Best way is to bring them into a warm place far enough in advance of use. Don't ever attempt to warm them up by direct application of heat.

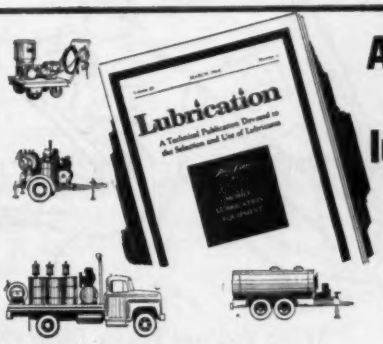
Save the engine— not the anti-freeze

Go slow on using last year's anti-freeze. Although it might still give good protection against freezing, chances are those chemical additives that protect the cooling systems of your engines against rust and corrosion have lost their punch. Your best bet, after draining and thoroughly flushing the radiators, is to fill them up with fresh new anti-freeze — such as Texaco P-T Anti-Freeze.

"Easy does it"... after an oil change

When an engine's crankcase is drained — so is the oil pump's intake sump and pipe. And when the engine starts up, the oil pump must first suck up a lot of air before it starts chewing oil.

To avoid possible damage to the engine, idle it first at low speed. The oil pressure should begin picking up in a matter of seconds and reach normal readings within several minutes. Wait until it does — before you start working the engine.



All about mobile lube rigs

- How to make good lube rigs
- How to use lube records to make rigs more valuable
- Special purpose lube rigs
- Pros and cons of mobile and centralized lubrication

These are just a few of the facts about mobile lube rigs you'll find discussed in the March 1960 issue of Texaco's *Lubrication* magazine. We've devoted the whole issue to it —and we'll send you a copy *free*. Write today to Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. CM-20.

TEXACO LUBRICATION ENGINEERS

From time to time, we'll bring you "sleepers" like these—little angles that can mean big savings in time and money. But for any specific lubrication problem, call on your local Texaco man. He's your *best* source of money-saving lubrication ideas. Remember, "Lubrication is a major factor in cost control."

Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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When you use Foster Lightweight Piling you get really lower costs—*plus* the safety and versatility of high-strength steel sheeting.

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For temporary use, or to supplement current piling stocks, you can rent through Foster's Piling Rental Plan and get big savings by eliminating capital tie-up in big piling inventories.

For all types of piling, for highway and construction products, call the Foster Specialist nearest you. Write or call **L. B. FOSTER CO.** for Lightweight Piling Catalog CM-12. Pittsburgh 30, New York 7, Chicago 4, Houston 2, Los Angeles 5, Atlanta 8, Cleveland 35.

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Circle 12 on Reader Service Card

Construction News From Washington

Washington, D.C.
December, 1960

New Administration Will Boost Construction

The outlook and attitude of the federal government on national development and construction will undergo a marked change next month. President-elect John F. Kennedy and his fellow Democrats made it clear during the campaign that they aim to broaden and intensify federal effort in a wide range of programs that call for heavy construction outlays.

Outstanding among them are natural resources projects, aid to schools and colleges, urban development on an unprecedented scale, stepped-up housing schedules, faster progress on waste treatment plants, and assistance to depressed areas for construction of public and private facilities.

Big River Programs Lie Ahead

Closer cooperation between Congress and the new President also is expected to step up development of river basin development. Both favor faster construction of worthwhile natural resources projects—and revision of evaluation criteria to make more projects feasible.

Experts are asking for $11.5 billion for flood control.

Estimates of what such programs involve have been assembled by the Senate Select Committee on Water Resources for a January report.

A recent Corps of Engineers' 20-year projection for the Committee on Floods and Flood Control estimates that the annual potential loss in major flood areas will climb to $960 million a year by 1980. This potential loss could be cut in half, say the Engineers, by construction of $11.5 billion of projects that now appear practicable.

Included in this total are $2 billion to complete works now under construction and $3 billion to build other projects already authorized but not yet started. To these figures, the Engineers add $6.5 billion for additional new projects now believed to be justifiable. Completion of the $11.5 billion undertaking by 1980 would require accelerating the present $300 million-per-year construction rate for flood-control works, exclusive of multiple-purpose projects, to $500 million a year by 1970 and holding the rate at that level for a decade.

Single-party control of both White House and Congress opens the door to a period of harmony on these and other legislative matters effecting construction.

Harmony even on deferred Democratic measures, however, will require astute leadership both in the White House and in Congress. The New Administration has to win and hold the loyalty of Southern Democrats who, in alliance with conservative Republicans, have blocked some of these very bills.

Economy never came in such a choice!

NEW FORD TRUCKS FOR 1961

619 new models! All engineered with one idea in mind . . . economy! New "Big Six" engine for 2-tonners plus five Cummins diesels for the new H-Series tractors expand the proven line of Ford engines to 18—with one just right for your job. A wider-than-ever choice of transmissions and axles! And . . . on all 1961 Ford Trucks, each part, except tires and tubes, is now warranted by your dealer against defects in material and workmanship for 12 months or 12,000 miles, whichever occurs first. The warranty does not apply, of course, to normal maintenance service or to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points.

New! "Big Six" Engine

More power for America's savingest 2-tonners . . . a big 262-cu. in. Six with the performance of big displacement, the durability of heavy-duty construction, plus the gas economy of 6-cylinder design! Available early 1961. You also get improved riding comfort with new smoother-acting springs and a sturdy front suspension that can give up to twice the tire life of other makes.

Now! 100,000-Mile or 24-Month Warranty on Ford Truck Super Duty Gas Engines

New 100,000-mile warranty on Super Duty V-8 gas engines is most liberal in the industry. On 401-, 477- and 534-cubic-inch V-8's, Ford Dealers will replace any major engine part (including block, heads, crankshaft, bearings, valves, pistons, rings) found to be defective in materials and workmanship in normal on-highway use. Warranty covers full cost of replacement parts for 100,000 miles or 24 months, whichever occurs first . . . full labor costs for first year or 50,000 miles, sliding percentage scale thereafter.

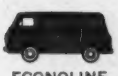
New! Styleside Pickups

Ford's Styleside Pickups, with 6½- and 8-foot bodies offer greater loadspace for '61—as much as 16% more! New one-piece cab-body design on longer wheelbases gives new comfort, greater durability. They're big in savings—as proved in certified studies of gas mileage and tire life. They're big in every way except in price—in fact, they're priced* as much as $157 below other comparable pickups!

Based on a comparison of latest available manufacturers' suggested retail delivered prices

NOW! CHOOSE FROM 7 NEW SERIES . . . GVW'S UP TO 51,000 LB.— GCW'S UP TO 76,800 LB.

FALCON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PARCEL

F-SERIES

C-SERIES

T-SERIES

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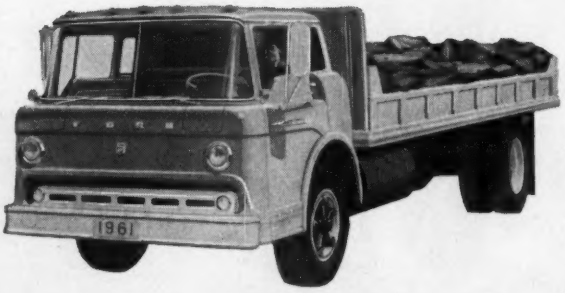
TURN PAGE FOR MORE NEWS ABOUT 1961 FORD TRUCKS

Circle 15 on Reader Service Card

FOR 1961 FORD TRUCKS

New! Space-Saving Tilts

Ford's popular Tilt Cab Series outsells all other makes and for good reason! Compact 82-inch BBC permits longer bodies for a given over-all length, and wide-track front axle makes it more maneuverable for congested area work. Simplified tilting mechanism exposes entire engine for money-saving ease of servicing. Ford offers the lowest-priced* tilt-cab model in the industry!



New! 4-Wheel Drive Pickups

Ford offers the lowest-priced* 4 x 4 with big 8-ft. box. And these models have the getup and traction to go most anywhere . . . road or no road! You can choose the gas-saving 135-hp Six, or the 160-hp V-8 that gives extra power and smoothness with "six-like" economy.

New! Durable Tandems

Ford's Tandem Axle trucks for '61 are engineered to give you greater flexibility and significant payload advancements. Your choice of 22,000-lb., 28,000-lb., 30,000-lb., 34,000-lb., or 38,000-lb. axle capacity. New, longer wheelbases are available to permit installation of special bodies up to 21 feet long. Aluminum walking beams as well as aluminum wheels and gas tanks are optional to keep chassis weights low and payloads high.

New! Econoline Pickup

Modern cab-forward design pares away 1,000 lb. of dead weight, yet you get as much payload capacity as standard ½-tonners! It's three feet shorter, yet there's a big 7-ft. box with 73 cu. ft. of load-space! You get lively performance and proven gas economy with the popular Falcon Six. And, the best news, Ford's Econoline Pickup is America's lowest-priced* pickup—bar none!

New! Falcon Pickup

Ford's Falcon Ranchero is priced* as much as $231 less than leading conventional pickups—but initial cost is just the beginning of your savings! Certified tests by independent experts show gas mileage with the 85-hp Six as high as 30.5 mpg. You only change oil every 4,000 miles, and aluminized mufflers last up to three times as long. New, high-performance 101-hp Six is optional.

Based on a comparison of latest available manufacturers' suggested retail delivered prices

OFFER YOU GREATER ECONOMY AND DURABILITY IN EVERY WEIGHT CLASS

New! Super Duty Extra Heavies

Ford's Extra Heavies are built for unprecedented durability! Double-channel frames for truck models and single-channel frames of high-tensile steel for tractor models have been designed to provide proper strength with minimum weight. Huskier axles, wider power train choice, short 28-inch front axle setting, plus new high-durability cabs and sheet metal are typical of the advancements that add up to greater earning power for you.

New! Diesel- or Gasoline-Powered Tractors

Ford's new H-Series tractors with 28-inch front axle setting and 82-inch BBC are offered in four diesel and four gasoline models with over 500 engine-axle-transmission combinations. Pull longer trailers and bigger payloads! Choose from ten industry-accepted engines—five Cummins diesels and five Ford Super Duty V-8's!

HEAVY TRUCK SERVICE

NATIONWIDE SERVICE... *look for this sign at Ford Dealers' across the country, for service on all Ford gas and diesel trucks!*

FROM SUPER ECONOMY PICKUPS TO SUPER DUTY DIESELS

FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE!

FORD DIVISION, Ford Motor Company

Circle 17 on Reader Service Card

New Barber-Greene

Latest addition to Barber-Greene Finisher line is a new step forward in advanced design and superior performance.

Barber-Greene's Model SA-40 is a new achievement in ease of operation and automatic features, combined with simple construction for greatest accessibility and ease of maintenance.

Its wide range of paving speeds to 100 F.P.M. and travel speeds to 4 M.P.H., together with its many other features assure the greatest tonnage production every hour—day and year of its long life.

Some of its outstanding features are shown below. Whether you are in the market now or not, you should be familiar with all of the advantages of this completely new modern design. Your Barber-Greene distributor will gladly give you full information. No obligation.

Only Barber-Greene Offers You Five Choices

COMPACT: Model 873, paves on crawlers, travels on rubber.

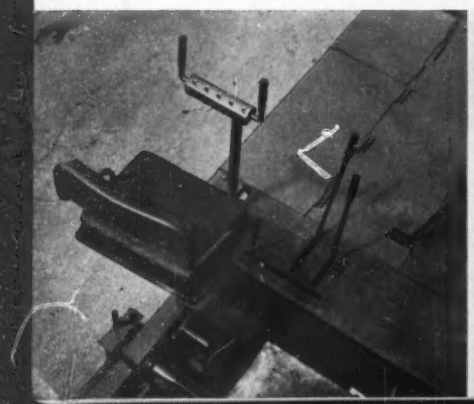
GENERAL DUTY: Model 879-B and new Model SA-40.

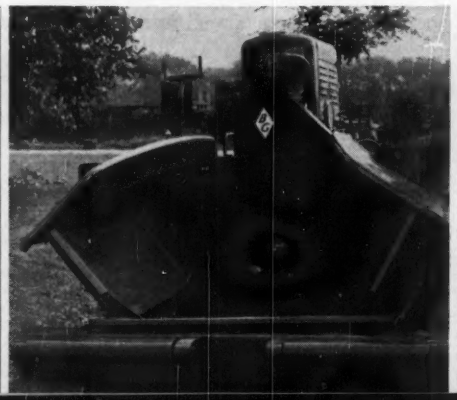
HEAVY-DUTY: Model SA-60 on Crawlers and Model SB-60 on Pneumatics.

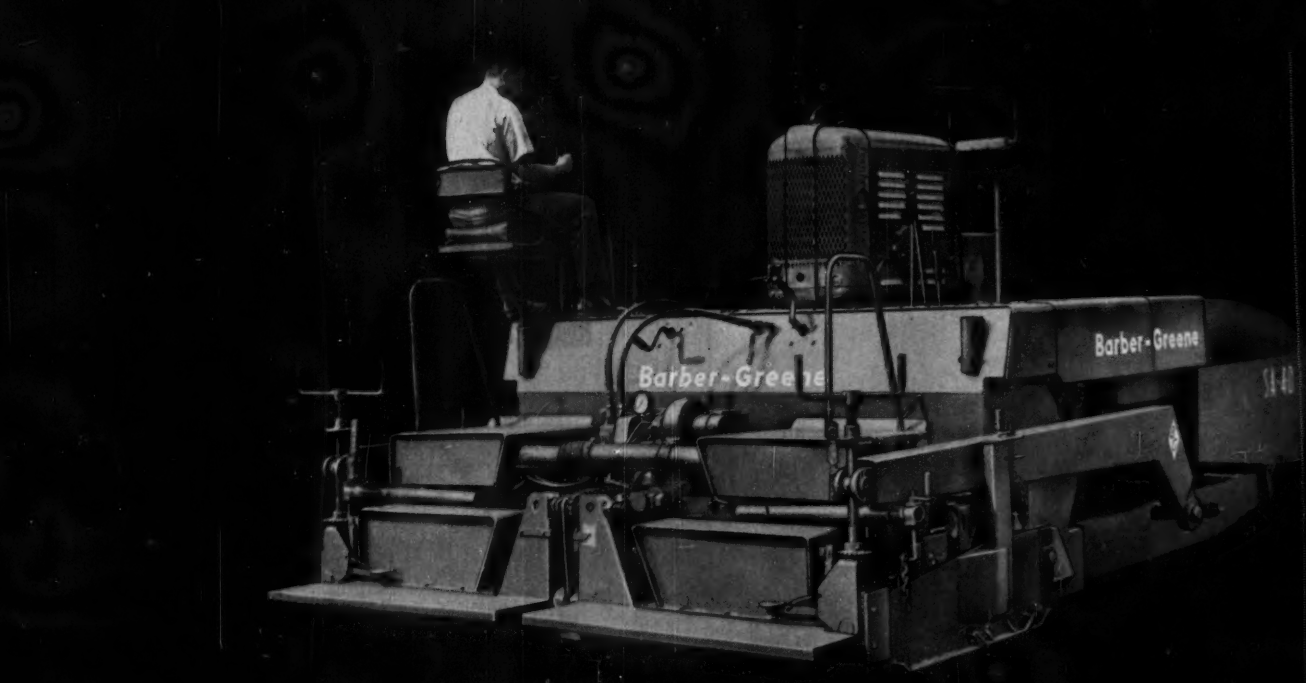
NEW EASE OF OPERATION. Joystick, power-assist steering. Switches on joystick control self-dumping hopper, screed hoist, etc.

HYDRAULICALLY SELF-DUMPING HOPPER. Tunnel extends to rear of chassis for maximum capacity and fastest truck dumping. Hopper gates controlled from screed platform while paving.

HEAVY-DUTY LONGER LIFE SCREED. Hydraulically operated, high speed tamper compacts before strike-off. Improved automatic leveling. Twin screed heaters.







SA-40 Finisher

Model SA-40 paves standard 10′ widths—variable from 8-14′. Handles all asphalt mixes. Carries shift-long fuel supply in 28-gal. tank.

World's No. 1 Manufacturer of Asphalt Paving Equipment

Representatives in Principal Cities of the World

Barber-Greene BG

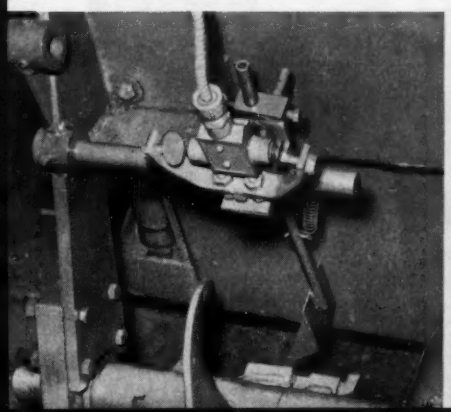
Main Office and Plant AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

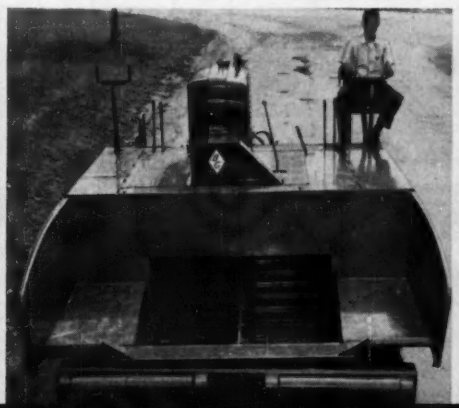
CONVEYORS • LOADERS • DITCHERS
ASPHALT PAVING EQUIPMENT

AUTOMATIC FEEDER CONTROL operates each pair of feeders and screws independently. Override switches on steering column.

OSCILLATING PUSH ROLLERS pick up trucks on-the-fly regardless of alignment. New long crawlers provide the ultimate in traction, leveling, and stability.

SIMPLIFIED SERVICING achieved through unitized construction and simple, efficient power train. Hinged deck plates for easy perimeter access.





Drill hard rock faster with your rotary rig and the

GARDNER-DENVER "MOLE-DRIL"®

Now—add new versatility to your rotary drilling rig with the Gardner-Denver "MOLE-DRIL"* in three sizes: AM4 (4″ dia.), AM5 (5″ dia.) and AM6 (6″ dia.).

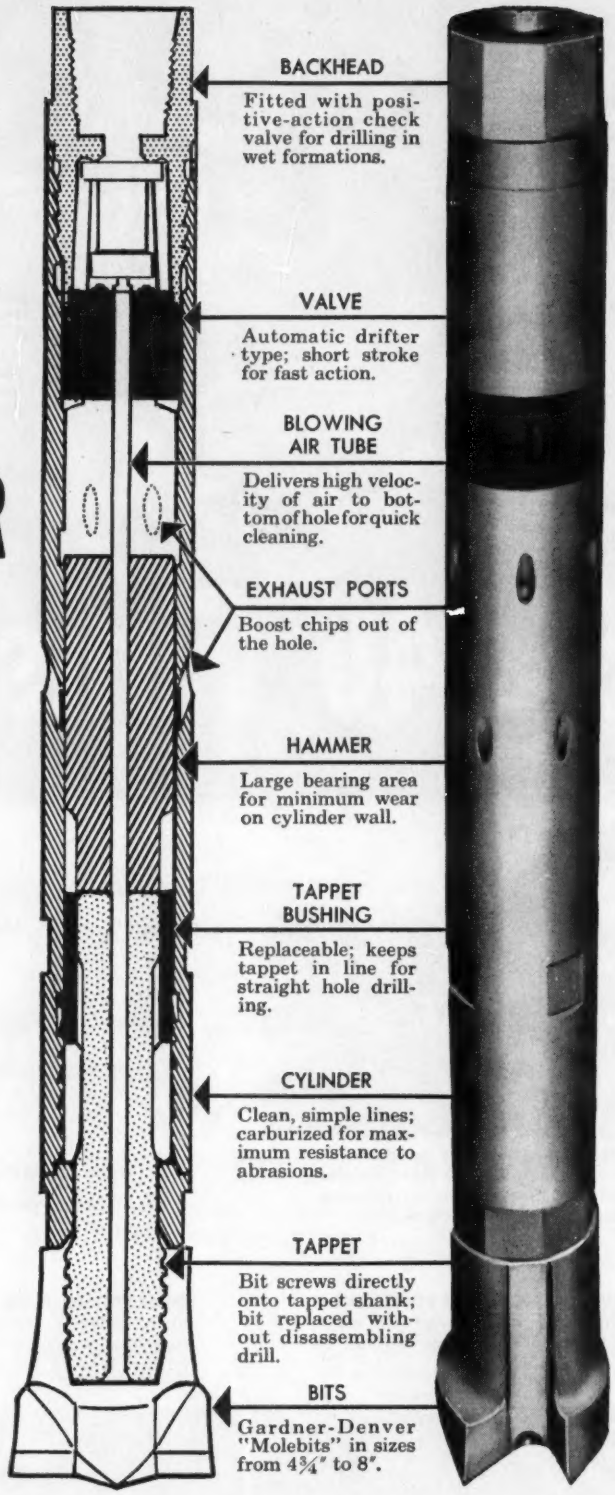
Add new power for fast hard-rock drilling with the heavy-duty, percussion-type "MOLE-DRIL." It screws directly onto your drill pipe . . . works at the bottom of the hole right at the rock face. There's no power-draining rod between the hammer and the bit.

ONLY 3 MOVING PARTS

Rugged construction cuts down time. Simple design reduces wear and trouble. Only three moving parts: valve, hammer and tappet. Compare these Gardner-Denver "MOLE-DRIL" features right down the line:

FOR FULL DETAILS,
WRITE FOR BULLETINS.

*Trade-Mark


BACKHEAD
Fitted with positive-action check valve for drilling in wet formations.
VALVE
Automatic drifter type; short stroke for fast action.
BLOWING AIR TUBE
Delivers high velocity of air to bottom of hole for quick cleaning.
EXHAUST PORTS
Boost chips out of the hole.
HAMMER
Large bearing area for minimum wear on cylinder wall.
TAPPET BUSHING
Replaceable; keeps tappet in line for straight hole drilling.
CYLINDER
Clean, simple lines; carburized for maximum resistance to abrasions.
TAPPET
Bit screws directly onto tappet shank; bit replaced without disassembling drill.
BITS
Gardner-Denver "Molebits" in sizes from 4¾″ to 8″.

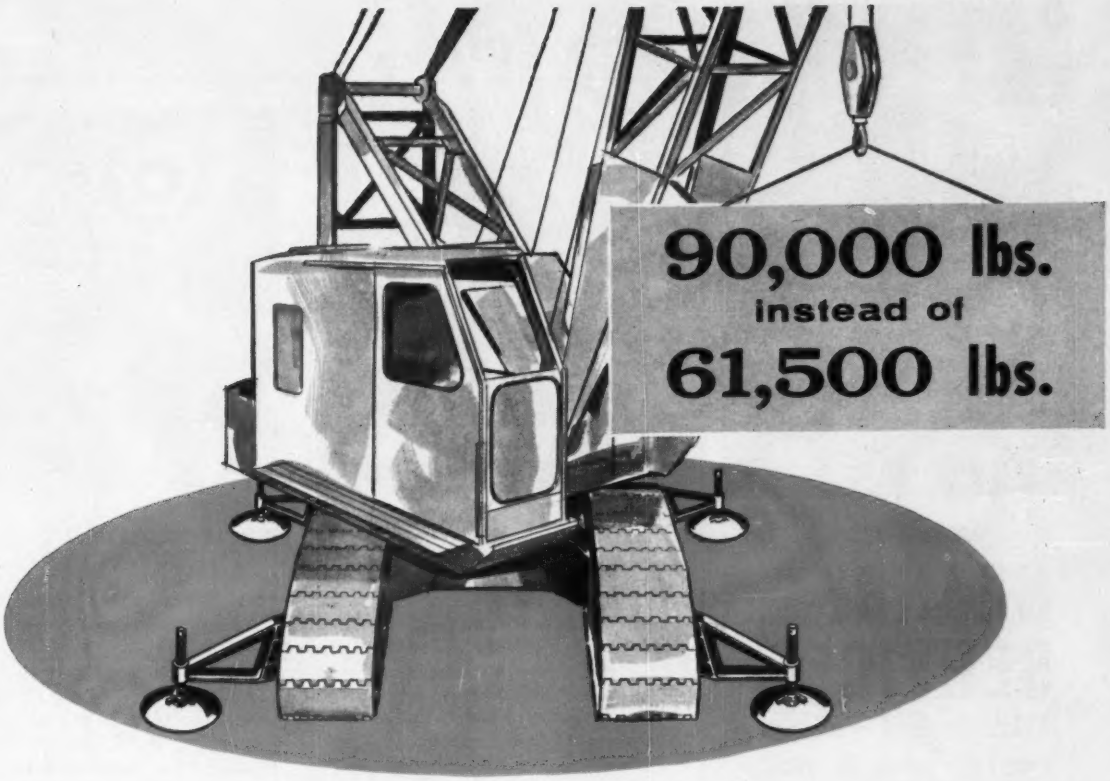
EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Circle 19 on Reader Service Card *Circle 20 on Reader Service Card*

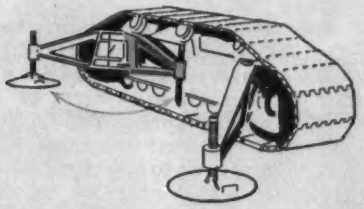


SOLID FOOTING: 46% MORE LIFT

"Sprawler" easily outlifts all crawler cranes of comparable size

"Sprawler" plants four big feet for bonus lift, better leverage

Weight lifter uses wide stance for better leverage, more stability.



Outriggers work on same principle, give better stability than counterweight alone. Increase your lift capacity from 61,500-lb to 90,000-lb.

Watch a weight lifter and you'll see the secret of the 545 Sprawler's bonus lifting capacity. Feet are spread and firmly planted to provide greater leverage . . . more stability under load.

Sprawler's pivoting outriggers provide a big, square, firm foundation . . . increase lifting capacity 46%. They are an integral part of the rugged, one-piece carbody, resist torsional strains at every working angle.

When crawling, outriggers tuck in close to crawler frame. And it takes only a few minutes to swing them out and pop on the pedestals to increase your lifting capacity. The 545 handles up to 150 feet of boom and jib.

545 Sprawler MAXIMUM LIFT CAPACITY WITH OUTRIGGERS IN PLACE: 90,000-lb	545 Sprawler MAXIMUM LIFT CAPACITY WITH PEDESTALS RAISED FOR WALKING: 61,500-lb

There's a Model 330 Sprawler, too! Lift bonus is 69%. The 330 will walk loads up to 35,450-lb, but with outriggers in place will lift 60,000-lb. See your distributor for details. K29

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

Circle 21 *on Reader Service Card*

. . . and for

NEARBY SERVICE on Black & Decker tools. Black & Decker maintains 50 factory service branches plus authorized service stations to give your B&D tools the attention mechanical products need periodically. Keep your B&D tools in top condition, on the job all the time.

Only factory parts and factory-approved methods are used. Fast service and reasonable cost, always.

SWIFTY SERVICE says be sure to ask about:

FREE TOOL INSPECTION no cost, no obligation.

STANDARD B&D GUARANTEE after completion of all recommended repair work.

You'll find the location of the nearest B&D repair facility in the Yellow Pages under "Tools-Electric," or write for address to: THE BLACK & DECKER MFG. CO., Dept. 2212-S, Towson 4, Md.

50th YEAR

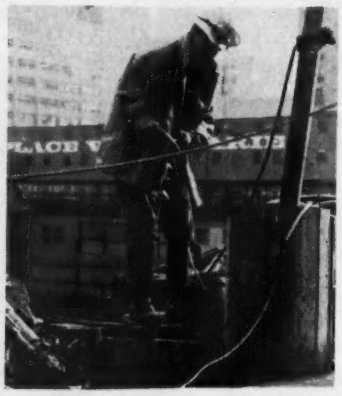
See Tools-Electric -Yellow Pages-for Service & Sales

Black & Decker®

Quality Tool Service

Circle 22 on Reader Service Card

Job Talk . . .



Chicago Wells Permit Precise Shoring

Laborious manual methods offered an economic advantage, for once, over more conventional mechanical methods in placing 90 soldier beams to secure an embankment along three sides of the Place Ville Marie project in downtown Montreal.

So that shoring timber could be mass produced rather than cut to fit, the contractor, the Foundation Company of Canada, Ltd., decided to place the soldier beams in hand dug Chicago wells. This expensive method was the only way to set them precisely at the correct 10-ft interval. Early experience with driving the soldiers to their 40-ft depth showed that rock outcroppings and boulders would deflect and damage the pile tips and create a jagged shoring pattern.

Two-man crews dug the 42-in.-dia wells by hand at the rate of about 4 ft per hr. One man at the bottom dug out material with either a shovel or a drill; a man at the top drew up excavated material in a bucket. As work proceeded, they inserted vertical timber lagging in the hole in 5-ft lifts. Steel rings consisting of ½x3-in. flat bars braced the sheeting.

It took a team about 10 days to complete a well. Labor costs averaged about $300 per well. Crews positioned the 12-in. WF soldier beams in the completed wells and secured them at the bottom with about 1 yd of concrete. Then they filled the remainder of the hole with stone dust, removing the well sheeting as backfilling proceeded toward the surface. Later, the soldiers will be salvaged with a pile extractor.

To eliminate rakers and provide a clean working face around the perimeter of the building lot, the contractor tied back each soldier beam with an inclined tie rod anchored some 30 ft deep in the embankment. First they drilled and cased a 2½-in. hole for each tie rod. In these sleeves they inserted 1⅛-in. high strength steel rods and grouted them in place by pumping concrete under pressure into the sleeves.

Dozer Mows Brush with Knife Blade

Equipped with a razor-sharp cutting edge at the bottom of its blade, a Caterpillar D8 is clearing as much as 4 acres of heavily wooded timber per hour at the site of a reservoir that will supply water to meet the future needs of Fort Worth, Tex.

The 14-ft-long knife edge, manufactured by the Rome Plow Co. of Rome, Ga., shaves small trees

continued on page 26

Circle 23 on Reader Service Card ➤

B&D Sander-Grinders 60% faster, get your equipment rolling faster!

Try a B&D 7″ H. D. Sander-Grinder in your own shop —watch it hog metal as much as 60% faster than anything you've ever seen. You'll find B&D Sander-Grinders run cooler, allowing longer continuous operation. Perfect overall balance and light weight assure less operator fatigue. Hot exhaust air is blown away from user.

To speed body sanding, grinding, cutting, brushing; to smooth welds, remove rivets, cut off studs fast, call your B&D jobber or mail coupon for a demonstration of a B&D 7″ Sander-Grinder.

Black & Decker Tools are sold by leading distributors everywhere. *For sales or service look in the Yellow Pages of your telephone book under* TOOLS ELECTRIC

Black & Decker®

CUTS MAN-HOURS TO MINUTES

REMOVE MATERIAL 60% FASTER under maximum load conditions. Cut down time with a hard-working B&D Sander-Grinder.

BODY SANDING GOES FASTER with the operator in control at all times. B&D Sander-Grinders ready work for paint—fast!

THE BLACK & DECKER MFG. CO., Dept. 2212
Towson 4, Md. (In Canada: Brockville, Ont.)

☐ Please arrange a demonstration of Sander-Grinder

☐ Please send additional information on.....

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

☐ Drills

☐ Vacuum Cleaners

☐ Polishers

☐ Valve Refacers

BIGGEST VALUE

The modern Allis-Chalmers HD-16 crawler tractor has the horsepower, weight and drawbar pull needed to handle most tractor jobs on your big spreads. With it, you stay in the same horsepower class as the biggest tractors available a few years ago and save the extra cost of moving up to "extra big" machines.

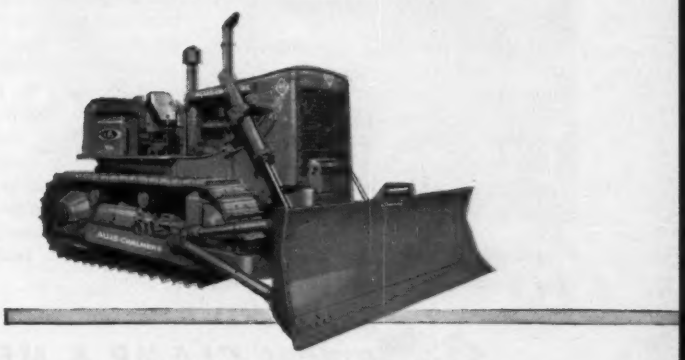
Look at the HD-16 . . . watch it work . . . compare it to any other crawler and you'll be convinced that, dollar for dollar, you can't buy a bigger producer. Here is an up-to-date power package that converts up to 150 hp at the flywheel to as much as 60,000 lb of drawbar pull. With bulldozer, more than 19 tons of "live-action" weight go to work moving material more profitably than any of your older "big" tractors.

With today's HD-16's, you maintain the power balance of your spread and add greater ease of operation and maintenance that keeps building production

. . . move ahead with

IN 150-HP CLASS

for you. Whether you are replacing outmoded tractors or moving up to more power, you will find it to your advantage to check the tremendous working range of the low-cost, big tractor—the Allis-Chalmers HD-16. See these advantages in action: *industry's healthiest engine . . . toughest track ever built . . . torque converter or all-gear drive . . . permanently lubricated truck wheels, idlers, rollers with tapered roller bearings.* Call your Allis-Chalmers construction machinery dealer for a demonstration. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



ALLIS-CHALMERS

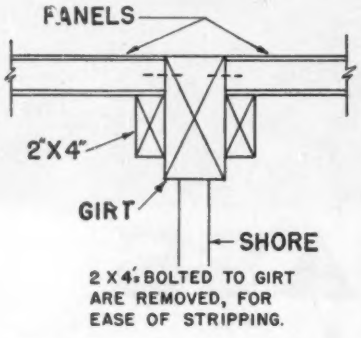
power for a growing world

Circle 25 on Reader Service Card

Slab Forming with Symons Steel-Ply Forms

Steel-Ply Panels Used Twice Per Month . . .
Material Costs Reduced to 10 Cents a Sq. Ft.

Slab forms were stripped in 10 days without disturbing the support shoring; still met specifications calling for 28 days of slab support.



When constructing apartments on the campus of Stanford University, Palo Alto, California, the contractor Howard J. White, Inc. had one big problem . . . how to reduce slab-forming costs. Savings had to be made on the main 15-inch foundation slabs of the three buildings. And on the basement walls.

Credit for developing a way to use Symons Steel-Ply Panels for slab forming goes to White's top management, and to Superintendent Buck Mills. The Oakland office of Symons Clamp & Mfg. Co. also helped appreciably with advice on engineering design.

Here's how it was done. 4 x 6 girts, laid longitudinally with the floor slab, are first set in place on shores and flush with the bottom of the slab. When the slab is poured, it bears directly on the timber girt. Next, 2 x 4's are bolted to the girt to form a ledge. Symons 4 ft. Steel-Ply Panels, being light (42 pounds), are easily dropped in place on the 2 x 4 ledge. No connecting hardware is used on the panels . . . carpenters simply drive a nail through a form-hardware opening to the girt, on each panel, so that when the 2 x 4 ledges are removed, the panels will not fall.

16,000 sq. ft. of rented Symons Panels were used in slab forming. *Used twice per month, material costs were reduced to 10 cents per square foot.*

For the complete story on *slab forming*, just send in your request on your company letterhead. Symons Steel-Ply Forms can be rented with purchase option.

Symons CLAMP & MFG. CO.
4255 Diversey Avenue Dept. M-O Chicago 39, Illinois
Warehouses throughout the U.S.A.

MORE **SAVINGS** FROM **SYMONS**

Circle 26 on Reader Service Card

JOB TALK . . .

continued from page 22

as cleanly as a lawnmower. And the dozer operator says it mows easily through thickets so thick they'd take the hair off a rabbit.

For larger trees of 30 in. dia or more, the operator gouges out chunks on each side of the trunk with a 12-in.-long stinger attached to the left end of the dozer blade. This oversize ice pick slashes through the heart of the tree to make it easy pickings for a single slice of the knife blade. In this way the rig can down a 6-ft-dia tree in about 2½ min, slicing it off close to the ground with almost dance-floor smoothness.

The D8 keeps two Caterpillar D7's busy stacking the grubbed-out timber in windrows for burning. Because the dirt-caked roots are all left in the ground, the freshly felled brush and timber burns like a torch at the touch of a match.

Blinker Directs Traffic

Portable signs appropriately dubbed "flashing flagmen" by their originators and users, the Oregon Highway Dept., come in handy for directing traffic on bridge and road jobs.

The signs feature flashing red and amber lights mounted on telescoping standards that hold the traffic control sign and a pair of yellow flags. Manually controlled so they can signal either a slow-down or a stop, the lights can be raised as much as 10 ft by extending the telescopic stand. Powering the lights and serving also as a weight to stabilize the stand against wind is a 12-v battery held in a steel frame at the base of the stand, which is fitted with two rubber wheels to make the sign unit easily movable.

"Cities Service Lubrication Engineer Helped My Business Get Started"

"How could we afford a lubrication engineer?" says W. P. Lynch, who has been employed in the asphalt business for fourteen years and now runs his own less-than-one-year-old company. "Of course we couldn't! So we found a company that would give us the services of a lubrication engineer. It relieves me of an important problem as we're starting out here."

From previous experience, Lynch was acquainted with Cities Service and their lubrication engineers. Upon forming his own firm, Lynch turned to Cities Service and Lubrication Engineer, Jeff Combs. Combs undertook the task of solving Lynch's lubrication problems. Combs answered all questions about the use and application of petroleum products. He assisted in the selection and purchase of lubrication equipment. Among the Cities Service products recommended by Combs and used by Lynch: C-300 Motor Oil for all automotive equipment, Trojan Greases and Oils for general lubrication and gears, DC-950 as a "hot oil" for heat transfer in the asphalt plant.

To find out how the professional assistance of a Cities Service Lubrication Engineer can help in the operation of your business, call your nearest Cities Service Office. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Portable hot mix asphalt plant with 120 tons per hour capacity is owned by Lynch. Other equipment includes trucks, rollers, compactors, graders.

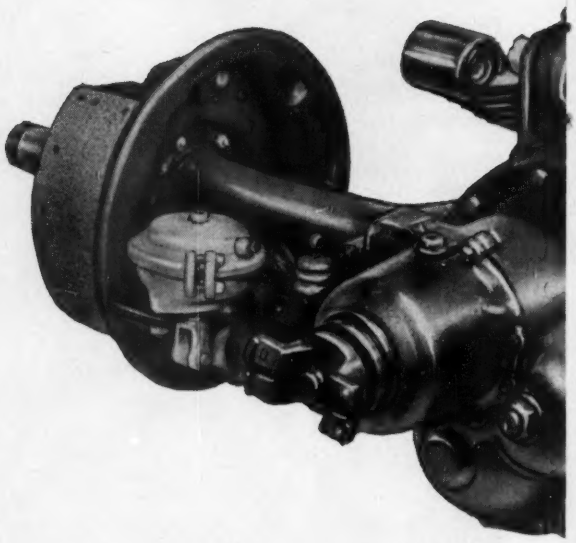
Employees are shown here using company's asphalt paving machine to pave church parking lot. Road and driveway paving are also done by Lynch.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Circle 27 on Reader Service Card

Hours of twist tests and road tests proved the quality and endurance of new IH bogies.



Now!

INTERNATIONAL Six-Wheel Trucks offer

NEW TANDEM DESIGNED AND

give you greater load capacity, more savings

Lightweight, simplified power divider — Through-drive hypoid design transmits equal driving force from triple helical gears to forward axle and then through drive shaft to rear axle. Both drive pinions rotate in a 1-to-1 ratio.

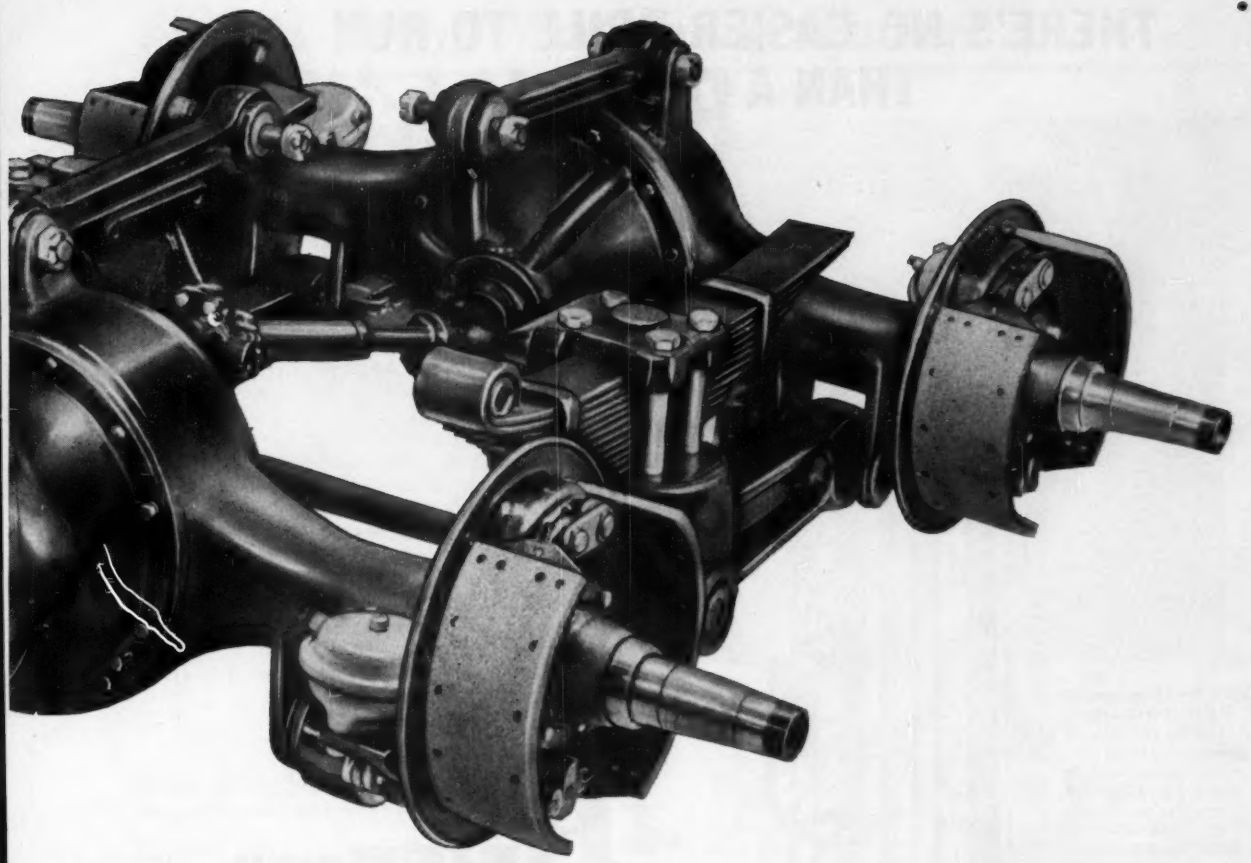
Induction-hardened axle shafts—Induction heating provides a hard, deep outer case and maintains a tough inner core for up to 10 times more resistance to shock loads. Axle shafts will not "fan-out"—they cut the possibility of fragments in the differential or axle housing.

Rugged, lightweight, through-drive design—Handles bigger payloads with less wear and tear. Provides greater strength and increased torque capacity. You work better both on and off highway, at high or low speeds.

Clean-cut appearance — Differential carriers are centered, all drive parts are kept within diameter of housing banjo. Brake diaphragms are in protected areas. Shafts and other parts interchangeable between axles.

Now three IH bogies available — Weight ratings of 30,000, 34,000 and 38,000 lb. capacities. Available in INTERNATIONAL Trucks of conventional, compact, and cab-over-engine designs from 37,000 to 53,000 lbs. GVW, up to 127,000 lbs. GCW, with gasoline, diesel or LPG power.

IH Built, IH Serviced, IH Warranted — Built by the makers of the most complete line of trucks—sales leader in six-wheel trucks for 25 straight years. Service availability nationwide. Performance warranted for 100,000 miles.



AXLES BUILT BY IH

in weight, backed by a 100,000 mile warranty!

Compact-design for a variety of loads.

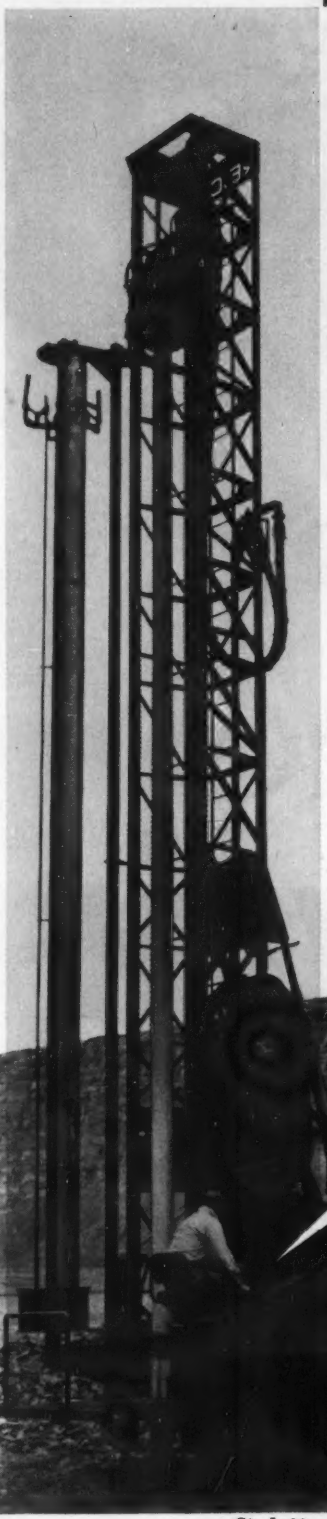
Mighty "6's" take transit-mix loads anywhere.

Delivers huge dump trailer loads with ease.

INTERNATIONAL® TRUCKS WORLD'S MOST COMPLETE LINE IH®

International Harvester Company, Chicago • Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

THERE'S NO EASIER DRILL TO RUN THAN A REICHdrill!



T-750 truck-mounted REICHdrill. Hole size to 12"; down pressure 45,000 lbs. Other models available, truck or crawler mounted, with hole size to 16 inches, down pressure to 90,000 pounds

This smooth operating, all-hydraulic rotary rig is helping REICHdrillers set higher footage records.

In blast holing, prospecting and coring, there's no easier drill to run than a REICHdrill. And the key to money making drilling records is a simplified *control "console"*. From it, every move required by the driller . . . every decision he makes...is converted smoothly, instantly, by the all-hydraulic system, into positive, time-saving performance.

Hydraulic drive to drill stem eliminates power loss . . . transmission troubles . . . kelly and rotary table.

Vari-speed Hydraulic Drill Control gives the operator the right combination of rotary speed and feed pressure for every formation...leveling jacks, mast raising cylinder and barrel loader are hydraulic too!

Other features: fast, easy set-ups; masts incline for angle drilling; CP heavy-duty compressors; CP Air-Blast Bits for extra footage in toughest formations. *You get more from your rotary when it's a* REICH*drill!*

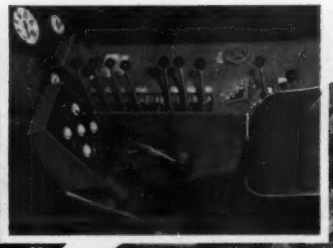
For further information write:

REICHdrill

FRANKLIN (VENANGO COUNTY), PENN.

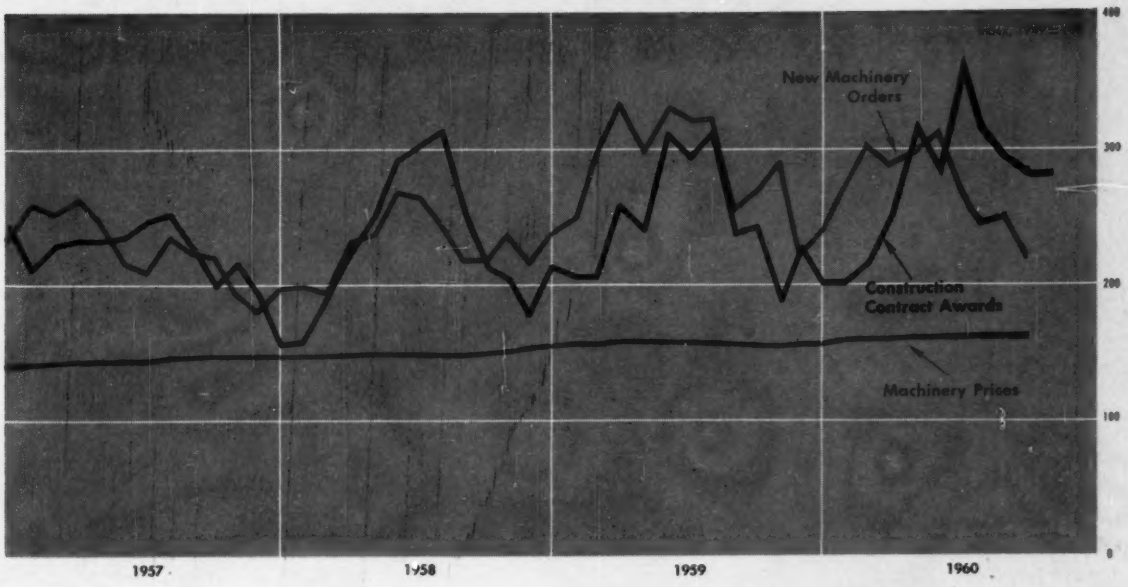
Division: CHICAGO PNEUMATIC TOOL CO.

Positioned at control "console", REICHdriller has every rig maneuver in sight . . . every rig control in reach.



Circle 30 on Reader Service Card

Trends in the Machinery Market . . .



Price Index

	OCT. 1960	MONTH AGO	YEAR AGO	% CHANGE 1959-1960
All Types of Equipment	177.0	176.7	172.5	+ 2.6
Cranes; Draglines, Shovels	**173.6**	**173.6**	**170.5**	**+ 1.8**
Shovel, ½ cu yd	167.9	167.9	165.0	+ 1.8
Shovel, ¾ cu yd	175.4	175.4	173.9	+ 0.9
Shovel, 1-1½ cu yd	189.3	189.3	184.3	+ 2.7
Shovel, 2-2½ cu yd	170.3	170.3	164.7	+ 3.4
Shovel, 3-3½ cu yd	167.8	167.8	167.8	0
Shovel, 6 cu yd	197.9	197.9	195.0	+ 1.5
Crane, truck mounted	168.2	168.2	166.2	+ 1.2
Crane, tractor mounted	135.1	135.1	135.1	0
Bucket, clam shell	162.9	162.9	157.5	+ 3.4
Bucket, dragline	169.3	169.3	169.3	0
Scrapers and Graders	**166.6**	**166.6**	**165.7**	**+ 0.5**
Scraper, 4 wheel, 8-10.5 cu yd	155.0	155.0	155.0	0
Scraper, 4 wheel, 12-15 cu yd	156.8	156.8	156.8	0
Scraper, 2 wheel, 15-19.5 cu yd (a)	126.2	126.2	123.7	+ 2.0
Grader, heavy duty	174.1	174.1	172.6	+ 0.9
Grader, light & medium	170.9	170.9	171.1	— 0.2
Tractors (non-farm, incl Industrial)	**194.1**	**193.6**	**187.8**	**+ 3.4**
Wheel type, off-highway (a)	129.2	129.2	128.2	+ 0.8
Crawler type, 50-74 dhp	203.5	203.5	191.9	+ 6.0
75-99 dhp	204.3	204.3	196.4	+ 4.0
100-154 dhp	199.2	198.2	191.3	+ 4.1
155-200 dhp	205.4	203.3	201.3	+ 2.0
Machinery, Tractor Mounted	**176.2**	**176.2**	**168.6**	**+ 4.5**
Dozer, cable controlled	164.8	164.8	154.4	+ 6.7
Dozer, hydraulic controlled	201.9	201.9	186.6	+ 8.2
Cable power control unit	152.9	152.9	151.4	+ 0.9
Loader, tractor shovel	163.9	163.2	161.5	+ 1.5
Specialized Machinery	**158.8**	**158.6***	**156.4**	**+ 1.5**
Ditcher	153.8	153.8	152.8	+ 0.7
Roller, tandem	226.4	226.4	220.2	+ 2.8
Roller, 3 wheel	178.7	178.7	174.9	+ 2.2
Ripper and rooter	164.5	156.6	150.5	+ 9.3
Dewatering pump, 10 M gph	111.5	111.5	110.3	+ 1.1
Dewatering pump, 90 M gph	151.5	151.5	151.0	+ 0.3
Portable Air Compressors	**167.5**	**167.5**	**167.5**	**0**
Contractor's Air Tools	**181.6**	**181.6**	**181.6**	**0**
Mixers, Pavers, Spreaders	**161.8**	**161.8**	**157.5**	**+ 2.7**
Mixer, portable, 11 cu ft	166.8	166.8	165.9	+ 1.0
Mixer, portable, 16 cu ft	172.7	172.7	172.2	+ 0.3
Mixer, truck, 6 cu yd	135.1	135.1	132.4	+ 2.0
Mixer, paving, 34 cu ft	196.7	196.7	193.5	+ 1.6
Concrete finisher & spreader	201.9	201.9	196.7	+ 2.6
Bituminous distributor	126.2	126.2	122.3	+ 3.1
Bituminous spreader	179.4	179.4	170.2	+ 5.4
Bituminous paver	165.6	165.6	163.4	+ 1.5
Off-Highway Trucks, Wagons (b)	**102.5**	**102.5**	**101.1**	**+ 1.3**
Contractors off-highway truck (b)	102.0	102.0	101.1	+ 0.9
Trailer dump wagon (b)	106.7	106.7	101.4	+ 5.2

• (a) January, 1955 = 100 • (b) January, 1958 = 100 * Revised
BLS Primary Market Price Indexes, U. S. Department of Labor, 1947-49 = 100

Contracts Boom But Equipment Buying Lags

Heavy construction contractors signed up more dollars worth of new business in 1960 than any other year on record. Contracts reported by *Construction Methods* spurted 13% above 1959 in the first 10 months of this year.

But contractors have been in no rush to buy new equipment. Orders placed with manufacturers dropped 13% in September. This decline pulled the McGraw-Hill Economics Department's new orders index for construction and mining machines down to 223, based on average monthly dollar volume in 1949 as 100.

This was the lowest month for new orders since August '58 and 21% off the year-ago pace when the index set an all-time September high. The index is based on total order volume of cooperating companies, each predominantly a manufacturer of construction and mining machinery.

The chart above shows how the gap has widened between contract awards and new orders for equipment, though both moved in the same direction in September. Contractors apparently are not buying as much new equipment per dollar of construction contracts as they did in 1959.

But the high volume of new work that's been piling on contractors' books in the last 8 months or so is likely to lead to more buying in the months ahead —if, as seems sure to happen, new contracts continue their record pace.

List prices of new equipment averaged 2.6% higher than a year earlier on Oct. 15, according to the US Bureau of Labor Statistics price index. The index edged up 0.2% over September to a record 177.0, based on average list prices in 1947-49 as 100. Sharply higher list prices of rippers and rooters caused most of this rise in the average.

Exclusive new design of H-30 provides features and performance which are

unmatched

by any other 4-wheel-drive machine in the 1-yard class

Ever since 1948 when Hough pioneered the 4-wheel drive tractor-shovel the PAYLOADER has been the pacemaker of the industry. This continued leadership has been the result of constant research and development, better engineering and more experience than any other manufacturer.

Typical of PAYLOADER superiority is this smallest 4-wheel drive machine, which incorporates many advanced and exclusive design features unmatched by any unit of its-size and type.

The H-30 is the only unit of this size and type with boom-arms positioned completely ahead of the operator's compartment for the utmost safety.

The H-30 is the only unit of this size and type with a power-shift transmission which *does not* require *stopping* for a range-shift. It is of Hough design and manufacture.

The H-30 is the only unit of this size and type with dual brake pedals – giving an "operator's choice" of braking with or without transmission engaged.

The H-30 is the only unit of this size and type with a sealed and pressure-controlled hydraulic reservoir with renewable cartridge-type filter and fine-mesh screen.

The H-30 is the only unit of this size and type which has a separate oil-cooling radiator – a fan-cooled "oil-to-air" heat exchanger that cools the transmission and torque-converter oil.

The H-30 is the only unit of this size and type which has as much built-in accessibility. The dip-stick, filler cap, batteries, connections and other service points can all be reached from ground level.

The H-30 is the first and only 4-wheel drive tractor-shovel that has special seals on all bucket and lower loader points to keep grease in, keep dirt out and reduce wear in these pivot locations.

The H-30 is the only unit of this size and type that has a single hydraulic bucket ram and a high-leverage linkage with a minimum of working parts. The hydraulic lines feature the maximum use of formed tubing and a minimum of hoses. All these refinements help to cut maintenance costs and increase reliability.

The H-30 is the only unit of this size and type available with a complete complement of useful attachments including the exclusive Drott 4-in-1 bucket.

The H-30 has a greater horsepower-to-weight ratio than any other unit of this size and type. This provides more useable horsepower for digging, loading and travel operations.

Four-wheel brakes: The H-30 has four-wheel brakes that are equally effective in either forward or reverse. They are sealed against dust and dirt.

The H-30 has many other big PAYLOADER features including two-phase torque-converter, planetary final drives, power-steer, separate parking brake on drive shaft, rear-axle drive disconnect, 43° bucket tip-back at ground, 8'4" bucket-dumping clearance, full rear-axle oscillation. Bucket sizes range from ¾ to 2 cu. yd. (S.A.E. rated).

Your Hough Distributor who sells the complete PAYLOADER line of proven tractor-shovels has one of the finest service and parts facilities in the business, supplemented by Hough factory service personnel.

THE FRANK G. HOUGH CO.
706 Sunnyside Ave., Libertyville, Ill.

Send full data on the Model H-30 PAYLOADER.

Name_____

Title_____

Company_____

Street_____

City_____ State_____

12-B-1

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY – INTERNATIONAL HARVESTER COMPANY

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HOUGH®

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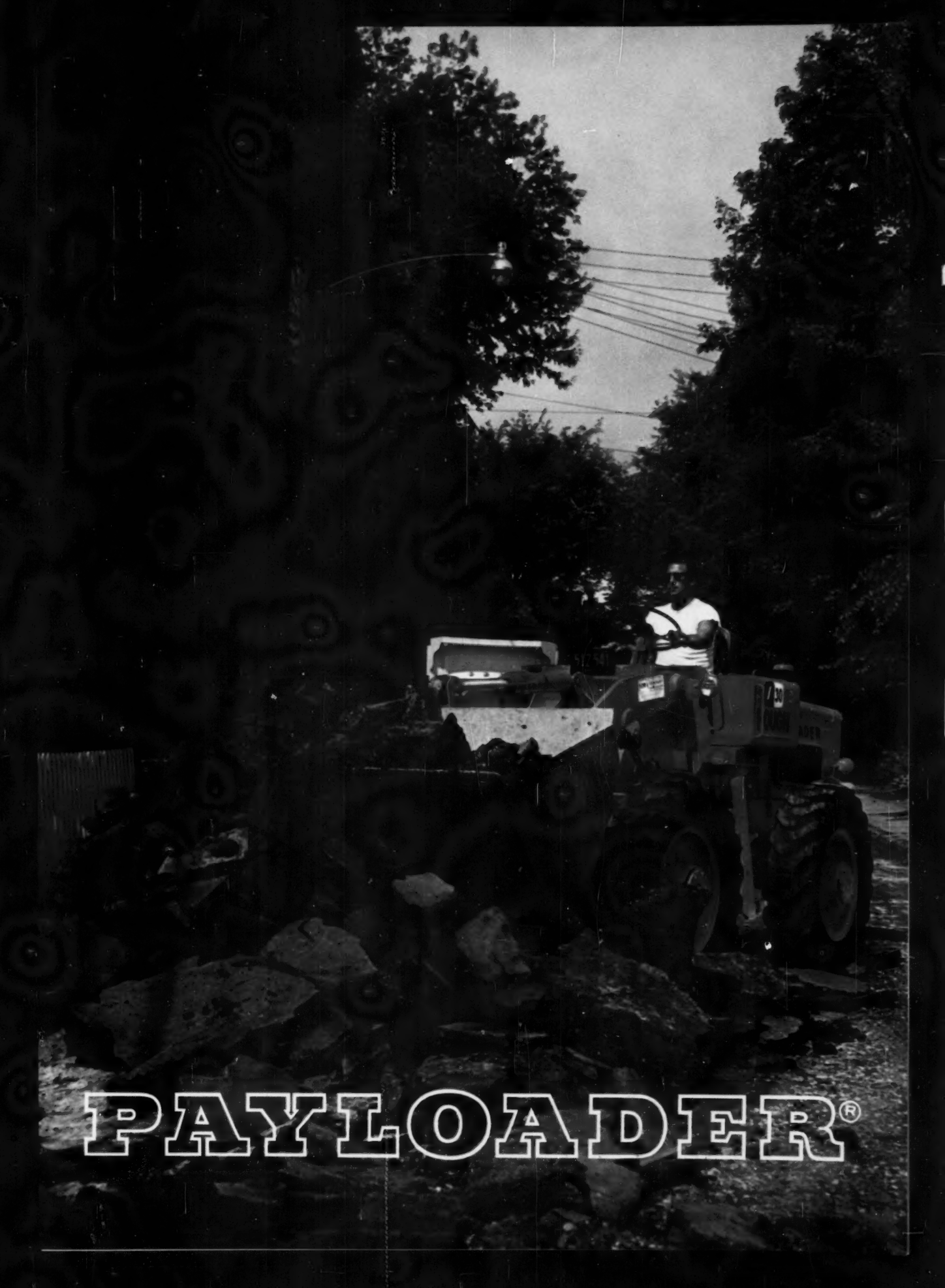
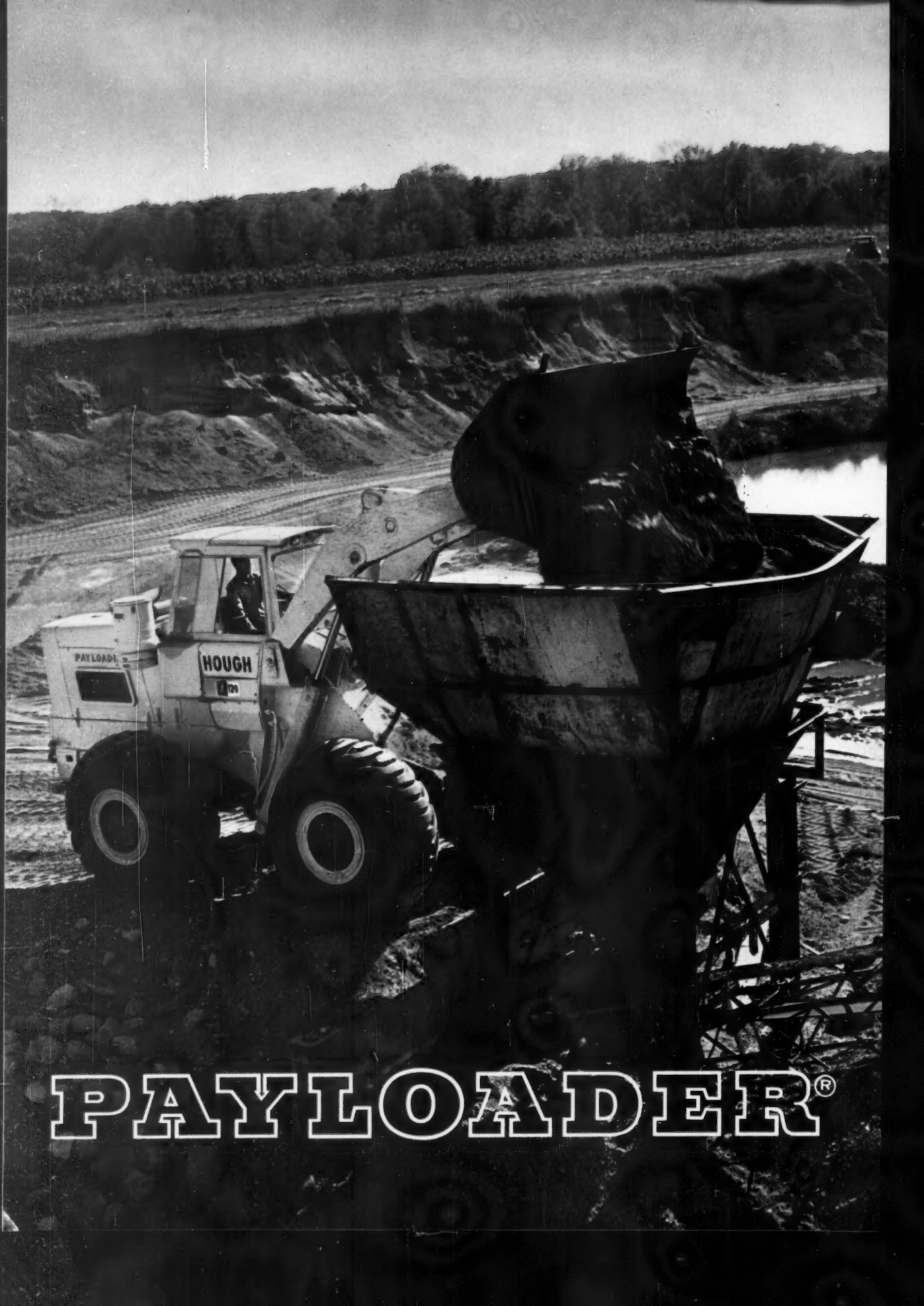


PAYLOADER®



PAYLOADER®

On-the-job performance of the Model H-120 proves it far more

productive

because it has more power, better balance, longer reach and more dumping height than any tractor-shovel in its class

Productive capacity and performance are the true measures of any machine, and the 4¼-yard Model H-120 excels on both counts. Hough's greater experience and "know how" in tractor-shovel engineering was never more apparent than in the design of this big PAYLOADER.

The Model H-120 has 300 horsepower – more than any other machine in this category. Maximum tractive and hydraulics demands are handled simultaneously without "lugging down." The H-120 has a higher horsepower-to-weight ratio – as much as 30% more than other machines in its size range – because a lot of useless dead weight has been eliminated.

The H-120 has more dumping clearance, and more dumping reach, than comparable units. It loads big trucks and railroad cars more evenly and easier – can stockpile higher.

The H-120 has better balance and stability because of the exclusive use of extra-strong "T-1" steel for box section boom arms that saves over a ton of dead weight on the load-carrying end. The approved and exclusive use of dry ballast material in the rear tires lowers the center of gravity with 50% of the weight below the rear axle.

The H-120 has a separate oil-cooling radiator that is fan-cooled. This exclusive feature provides effective cooling of the transmission-torque converter oil even in hot climates.

The H-120 is even easier to drive than smaller tractor-shovels, say the operators, because of power air-brakes, power-steer, power-shift, and unusual visibility.

The H-120 has a distinctive boom design, forward and clear of the operator for greater safety. It features a single bucket-tilting ram and high-leverage linkage with a tremendous breakout force. Another big advantage is simplicity and fewer parts, reducing wear and maintenance.

The H-120 has a Hough-built full power-shift transmission of advanced design. It is a full reversing, constant-mesh type providing 4 gear ratios in each direction. All four gear changes are made with one lever and *without stopping* for a "range" shift.

The H-120 has "Operators-Choice" brake control — exclusive in its class. Dual pedals permit the operator to brake with or without the transmission engaged, as desired for any operating situation. The large-capacity 4-wheel air brakes contribute greatly to the easy, safe handling of the machine.

The H-120 has special protection throughout to promote long life and reduce maintenance of the engine, drive train and hydraulic systems. A special dry-type, two-step, engine air cleaner gives 99.8% dust-removal efficiency under the most adverse conditions. The hydraulic system is sealed and pressure-controlled to keep out air-borne dirt, and also protected by an exclusive system of cartridge-type filter and fine mesh screens.

The H-120 is provided with canopy-type cab, windshield wipers and special lights as standard equipment. Bucket sizes are available from 3¾ to 8 cu. yd. (S.A.E. rated). The exclusive 4 cu. yd. Drott 4-in-1 bucket can also be supplied.

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY – INTERNATIONAL HARVESTER COMPANY

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER, PAYLOMATIC and PAY are registered trademark names of The Frank G. Hough Co.

HOUGH®

THE FRANK G. HOUGH CO.
706 Sunnyside Ave., Libertyville, Ill.

Send full data on big Model H-120 PAYLOADER.

Name_____

Title_____

Company_____

Street_____

City_____ State_____

12-B-2

Circle 35 on Reader Service Card

Rental Rates Show Slight Dip

EQUIPMENT rental rates in 1960 were generally lower than in 1959. That's shown by the compilation, for informational purposes only, made by Associated Equipment Distributors, Chicago. The table at the right tells how rates for over one-half of the major types of equipment listed averaged less in 1960 than in 1959. By contrast, only about one-third of the items show an increase over their 1959 average rental. About 10% remained unchanged.

Sharpest declines came in off-highway rear-dump trucks. Rentals for models of up to 20 tons body capacity averaged anywhere from 9% to 19% less than in 1959. Tractor-scraper rentals were off 4% to 6%, while pull scrapers dipped from 1% to 8%. Rentals were also down for most crawler power shovel sizes, with declines ranging from only 1% to 6%.

Rates for tractor shovels declined for some models, rose for others, according to AED figures. Centrifugal pumps tended to hold steady or increase, while compressor rentals were generally a little lower.

However, crawler tractor rates bucked the general downtrend. All but one of the tractor sizes listed in the gear drive category increased, while rentals of the 151-170 dbhp model group averaged the same as last year. But the trend was mixed for crawler tractors with torque converters—three size ranges have higher rentals, two have lower, and one has the same average as in 1959.

The 1960 drop in sales of new construction equipment in the US market probably influenced dealers to reduce rental rates in hopes of stimulating rental deals that thus bolster cash flow. Very depressed prices of used equipment, as well as some reported shading of list prices on new equipment, probably added to the pressure on rental rates.

Actually, the 1960 slide in equipment rental rates is no surprise to construction contractors. AED's compilation of 1958 rates revealed scattered reductions, on an average basis. And in 1959 there were quite a few types of equipment for which rental rates had declined from 1958. But increases outnumbered decreases in both years. Not until this year do we find reductions outnumbering increases.

Construction Machinery Rental Rates—1960

Associated Equipment Distributors, Chicago, Ill.

These rates are averages of prevailing rental rates made available for informational purposes only. All rates are fob lessor's warehouse or shipping point. Lessee pays transportation cost to destination and return. Rates do not include operator, fuel or oil. Lessor bears cost of repairs due to normal wear and tear on non-tractor equipment, the lessee bears all other costs. For tractor and rubber-tired hauling equipment, the lessee bears all costs for maintenance and repair. Rates are based on one shift of 8 hours per day, 40 hours per week, 175 hours per month of a 30 consecutive day period. Overtime is prorated on a per-hour basis. Equipment is delivered to lessee in good operating condition and returned in as good condition less normal wear. Excessive cleaning or repairs may be charged to lessee. Rental rates start when equipment leaves lessor's delivery point. All rents are payable in advance. No insurance, license, sales or use taxes are included in these rates.

Type of equipment	Per Month	Per Week	Per Day	Chg. '59-'60 †%
AIR COMPRESSORS portable				
Gas, 86—105 cfm	188.00	63.25	18.75	−1
Gas, 126—160 cfm	249.00	81.75	25.50	−0
Gas, 186—210 cfm	332.00	109.00	32.75	−1
Gas, 251—315 cfm	462.00	150.00	48.00	+1
Diesel, 186—210 cfm	404.00	133.00	41.50	−1
Diesel, 251—315 cfm	332.00	176.00	56.25	−2
Diesel, 366—500 cfm	730.00	242.00	74.75	+3
Diesel, 501—600 cfm	897.00	299.00	96.25	−2
CRANES, diesel crawler (no bucket) Capacity at ft radius				
Above 5 , to 6½ ton, 10'	946.00	311.00	104.00	−3
Above 8⅜ , to 11⅜ ton, 12'	1,245.00	414.00	149.00	−4
Above 14½ , to 19½ ton, 12'	1,519.00	528.00	170.00	+1
Above 24½ , to 29½ ton, 12'	2,045.00	678.00	264.00	−5
Above 29½ , to 34½ ton, 12'	2,452.00	829.00	291.00	+3
Above 18 , to 22 ton, 20'	3,100.00	1,066.00	354.00	−1
Above 10 , to 13 ton, 45'	4,250.00	1,477.00	474.00	+2
Above 20 , to 24½ ton, 45'	5,129.00	1,923.00	657.00	−6
GRADERS, diesel rubber tired Conventional transmission				
Up to 16,500 lbs	652.00	210.00	66.50	+4
16,501 to 20,500 lbs	803.00	276.00	82.25	−2
22,501 to 26,000 lbs	1,097.00	368.00	116.00	+2
26,001 to 30,000 lbs	1,337.00	464.00	143.00	−1
Torque converter				
16,001 to 21,000 lbs	1,115.00	371.00	118.00	+3
21,001 to 25,000 lbs	1,231.00	432.00	133.00	−7
25,001 to 29,500 lbs	1,429.00	486.00	154.00	−5
29,501 to 45,000 lbs	1,829.00	661.00	196.00	−9
LOADERS (SHOVEL), tractor Front end, wheel mounted, front or rear drive, gas				
Up to ⅜ cy	360.00	117.00	38.00	+7
Above ⅜, up to ½ cy	381.00	131.00	40.25	−3
Above ½, up to ⅝ cy	446.00	148.00	46.50	−1
Above ⅝, up to ¾ cy	516.00	175.00	57.50	−4
Above ¾, up to 1 cy	619.00	211.00	67.50	+1
Above 1 , up to 1¼ cy	747.00	256.00	79.75	0
Above 1⅜, up to 2 cy	1,213.00	420.00	136.00	+1
MIXERS, CONCRETE, portable				
Tilt drum, 3 to 3½ cf	65.50	23.00	7.50	−2
Non-tilt, non pwr charge, 3½ cf	85.00	30.25	10.00	−2
Non-tilt, power charge, 6 cf	129.00	44.75	14.25	+3
11 cf	186.00	65.00	23.25	+1
16 cf	264.00	88.50	30.75	−2
Add for batchmeter*	14.75	5.45	2.75	+5
Add for pump*	11.75	4.20	1.80	0
*Rates include measuring tank but not this				
PUMPS**				
Centrifugal, self priming				
Gas, 1½-in, 4M	52.00	18.00	5.95	0
Gas, 2-in, 7M-10M	64.25	22.25	7.55	0
Gas, 3-in, 15M-20M	80.00	27.75	9.45	0
Gas, 4-in, 30M-40M	122.00	41.75	14.25	0
Gas, 6-in, 90M	186.00	63.25	21.50	+2
Diesel, 6-in, 90M	360.00	123.00	42.75	+3
Diesel, 8-in, 125M	568.00	202.00	67.00	−4
**Hose not included				
ROLLERS Two-axle tandem, diesel				
5-8 tons*	519.00	162.00	55.00	0
6-9 tons	608.00	190.00	65.00	−2
8-10 tons	608.00	190.00	65.00	−2
†Percentage change in average monthly rates				

Type of equipment	Per Month	Per Week	Per Day	Chg. '59-'60 †%
ROLLERS continued Two-axle, tandem diesel				
8-14 tons	729.00	237.00	80.25	−2
10-14 tons	729.00	237.00	80.25	−2
10-16 tons	1,221.00	367.00	117.00	+3
*Net roller wt—max gross wt incl ballast				
SHOVELS, diesel crawler				
⅜ cy	946.00	314.00	104.00	−2
½ cy	1,184.00	394.00	130.00	−5
¾ cy	1,447.00	487.00	163.00	−3
1 cy	2,088.00	697.00	228.00	+2
1½ cy	2,621.00	879.00	282.00	−6
2 cy	3,923.00	1,323.00	425.00	−1
2½ cy	4,352.00	1,485.00	484.00	−4
3 cy	5,650.00	1,867.00	617.00	−4
3½ cy	6,815.00	2,269.00	744.00	+2
SCRAPERS, w.o. power units Heaped capacity				
Above 5, up to 7 cy	377.00	125.00	38.50	−1
Above 7, up to 10 cy	488.00	155.00	47.00	−5
Above 13½, up to 18 cy	702.00	226.00	73.25	−2
Above 17, up to 22 cy	917.00	303.00	96.25	−4
Above 22, up to 29 cy	1,159.00	392.00	126.00	−4
Above 29, up to 37 cy	1,678.00	551.00	166.00	−8
TRACTOR AND SCRAPER 2-wheel tractor with 2-wheel scraper (heaped capacity)				
From 7 up to 11 cy	1,447.00	511.00	151.00	−6
From 13 up to 16 cy	1,971.00	691.00	213.00	−5
From 16 up to 21 cy	2,393.00	855.00	274.00	−4
From 18 up to 20 cy	2,665.00	900.00	295.00	−4
TRACTORS, diesel crawler Gear drive, w.o. attachments				
25- 35 drawbar hp	415.00	141.00	42.00	+3
36- 44 drawbar hp	574.00	184.00	57.50	+1
45- 59 drawbar hp	703.00	228.00	73.25	+1
60- 71 drawbar hp	860.00	282.00	87.00	+7
72- 79 drawbar hp	1,009.00	331.00	105.00	+1
80- 95 drawbar hp	1,132.00	369.00	115.00	+4
96-115 drawbar hp	1,412.00	464.00	146.00	+4
116-131 drawbar hp	1,526.00	501.00	152.00	+6
132-150 drawbar hp	1,685.00	535.00	161.00	+5
151-170 drawbar hp	2,105.00	695.00	224.00	0
201-265 drawbar hp	3,273.00	1,075.00	341.00	+4
Torque converter, without attachments				
120-144 net engine hp	1,578.00	526.00	167.00	+5
145-164 net engine hp	1,650.00	574.00	188.00	−1
165-185 net engine hp	1,810.00	618.00	198.00	−2
186-214 net engine hp	2,313.00	751.00	221.00	+3
251-330 net engine hp	3,646.00	1,184.00	372.00	+1
over 330 net engine hp	4,029.00	1,437.00	480.00	0
BULLDOZERS For crawler tractors of				
36- 44 drawbar hp	167.00	57.00	18.50	+2
72- 79 drawbar hp	237.00	78.50	27.25	−5
96-115 drawbar hp	286.00	92.25	32.00	−4
132-150 drawbar hp	363.00	120.00	40.00	−3
201-265 drawbar hp	483.00	165.00	54.75	−1
TRUCKS, off-highway, rear dump Single drive axle, body capacity				
Above 7½, up to 10 tons	1,692.00	.....	.....	−19
Above 10, up to 15 tons	1,883.00	.....	.....	− 9
Above 15, up to 20 tons	2,058.00	.....	.....	−13
Above 20, up to 23 tons	2,632.00	.....	.....	− 6
Above 23, up to 25 tons	3,745.00	.....	.....	− 3

The new No. 12 Series E Motor Grader spreads untreated base and handles cleanup for Massey Sand and Rock Company

THE NEW NO. 12E SETS THE STANDARDS

Widening U. S. 60-77-99 to a 4-lane limited-access highway, Massey Sand and Rock Company of Indio, California, recently added a new No. 12E Motor Grader to its Cat fleet. The improvements, effective with this new series machine, showed up immediately. As Tom W. Carter, manager of the firm, puts it: "The increased productivity of the new No. 12 was very noticeable. You can depend on new Cat products to give greater operator comfort and better productivity."

One of the big reasons for the new performance standards of the No. 12 is the new compact 115 HP engine. Incorporating the latest developments in metallurgy and design, this modern engine has greater lugging ability for the tough jobs, long life and easier servicing.

Caterpillar engineers did not stop with just a compact diesel. There's a new vertical starting engine to give easier, all-weather starting. The dry-type air cleaner is now standard—it removes 99.8 per cent of air-borne dirt every service hour, cuts maintenance.

Circle 37 on Reader Service Card

Of course, the new No. 12 retains the dependable Caterpillar oil clutch that gives up to 2000 hours without adjustment; mechanical controls that engage easily; and plenty of throat clearance between moldboard and circle for improved rolling action.

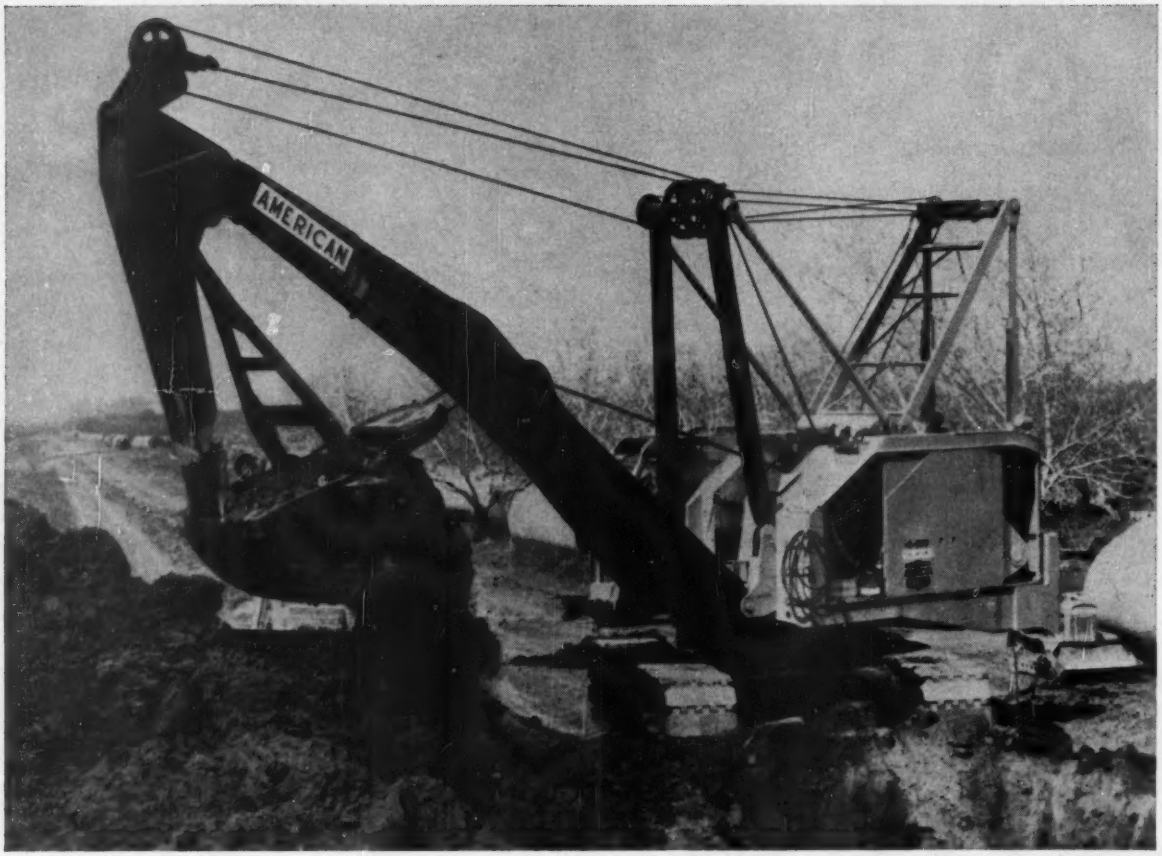
See your Caterpillar Dealer. He'll show you—on your job—that the No. 12E lives up to what users are saying about it. He can also show you the 150 HP No. 14, the No. 112F with 100 HP and the No. 112E with 85 HP—they're built to be the best for the job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE NEW NO. 12 MOTOR GRADER BUILT FOR THE TOUGH JOBS



WORLD'S BIGGEST BACKHOE!

IT'S THE ALL-NEW 900 SERIES AMERICAN — rated 4½ yards struck — today's answer to faster and more profitable big-yardage trenching. (Front end can be converted to heavy-duty dragline, clam, or crane with lifting capacities to 110 tons.)

Above, the 900 Series backhoe is shown digging a 6-mile section of aqueduct, measuring 12-ft. deep, 9½-ft. wide at bottom, and 25 ft. across the top. On this big cut, the 900 Series AMERICAN trenched up to 460 lineal feet per 8-hour day . . . an average of more than 425 yards hourly!

Owners Young & Anderson, of Brea, California, report that the machine "handled beautifully" on this job, which required laying 87-inch pipe alongside two existing lines. It was one of *five* AMERICANS used on this project.

Whether your line of work calls for 4½-yard backhoes — or capacities down to ½ yard — you'll find AMERICAN offers you operating advantages no other backhoe on the market can match.

Example: Ask about AMERICAN's exclusive *positive-pressure* digging action that gives you 50 to 300% more down pressure at the dipper teeth . . . cuts through the hardest materials . . . gives you heaped dippers on every pass, even at maximum-depth digging. Your AMERICAN distributor will be glad to give you the full story. B-703

AMERICAN

AMERICAN HOIST and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

EXCAVATORS ½ to 4½ yds.	DERRICKS-HOISTS to 800 tons	CROSBY-LAUGHLIN DIVISION
CRANES 12½ to 110 tons	REVOLVER CRANES to 400 tons	Forged fittings for wire rope, chain

Circle 38 on Reader Service Card

SOME BIG CONTRACT AWARDS OF THE MONTH

Diesel Construction Co., New York, N. Y. Erect a 30-story office building on Park Ave. and 48 St. in New York City. David Rose & Assocs., 340 W. 58th St. $18,000,000.

Gust K. Newberg Construction Co., Chicago, Ill. Construct third section of the Robert R. Taylor Housing Project in Chicago, Ill. Chicago Housing Authority, 608 S. Dearborn St. $17,483,000.

Guy F. Atkinson Co., South San Francisco, Calif. Construct the Briones Dam near Oakland, Calif. East Bay Municipal Utility District, 2130 Adeline St. Oakland. $13,888,094.

Spencer White & Prentis, Inc., New York, N. Y. Construct the foundation and substructure for a 21-story telephone exchange and office building in New York City. New York Telephone Co., 140 West St. $13,000,000.

Diversified Bldrs. Inc., Paramount, Calif., **Johnson Construction Co.,** Salt Lake City, Utah, and **Kaiser Engineers,** Oakland, Calif. A joint venture to construct a missile manufacturing plant. Division of Air Research & Development Command, Brigham City, Utah. $11,862,000.

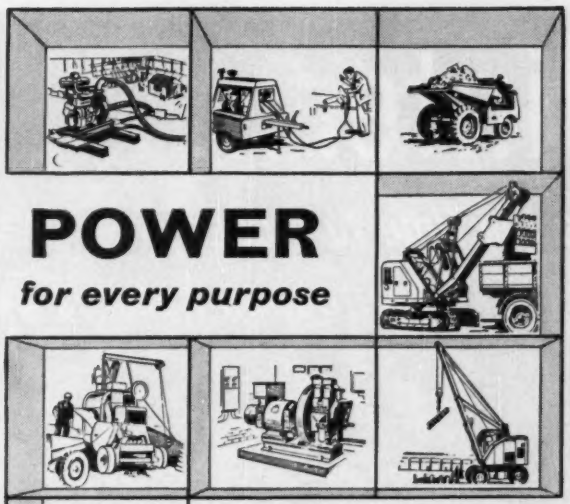
Frouge Construction Corp., Bridgeport, Conn. Construct a housing project in New York City. City Housing Authority, 299 Broadway. $10,418,512.

Barrett Construction Co., and **Theodore G. Meyers & Sons,** San Francisco, Calif. Erect a hospital in Martinez, Calif. Veterans Administration, Munitions Bldg., Washington, D. C. $9,985,000.

Robert E. McKee, Inc., Los Angeles, Calif. Erect a county hospital in San Diego, Calif., Room 306, Civic Center, San Diego. $8,823,650.

William L. Crow Construction Co., New York, N. Y. Construct an engineering building at Princeton University, Princeton, N. J. $8,000,0000.

Turner Construction Co., Boston, Mass. Erect a ten-story office ad-



POWER
for every purpose

Air-Cooled:
1½-72 HP
Water-Cooled
to 90 HP

LISTER
DIESEL ENGINES

ELIMINATE WINTER WORRIES! Built-in cold starting for sub-zero temperatures; totally enclosed working parts. No "freeze-ups". Power take-off, full rpm, flywheel end or half speed gear end. *Write for data and prices.*

LISTER-BLACKSTONE, Inc.
42-32 21st Street, Long Island City 1, N. Y. Tel.: STillwell 6-8202
Canadian Lister-Blackstone, Ltd., 1921 Eglinton Ave. E., Toronto 13, Ont.

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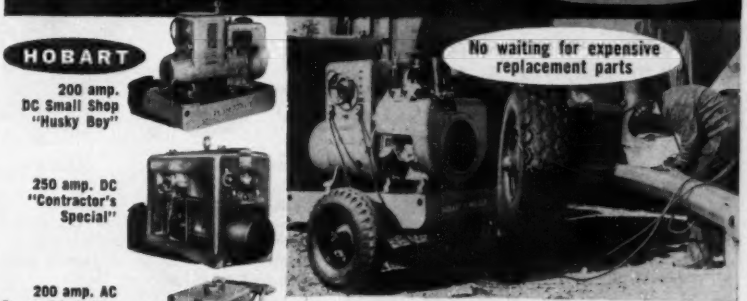
YOU CAN REALIZE GREATER PROFITS
...when you have your own welder on the job- NO DELAYS


HOBART
200 amp. DC Small Shop "Husky Boy"
250 amp. DC "Contractor's Special"
200 amp. AC Power/DC Welder Combination
400 amp. DC Self-propelled "Big Wheeler"
No waiting for expensive replacement parts

Make your own weld repairs anywhere any time. Keeps equipment working. Save big money and costly delays by having a Hobart welder ready to work for you on a moment's notice. Easy to use—no special skill or training necessary.

A wide variety of gas and electric drive welders and models with auxiliary power allows you to pick the ideal unit for your work. Built-in extra features, at no extra cost, speed up welding, make tough jobs easy, improve operator's efficiency. Fill out and mail the coupon for complete details. HOBART BROTHERS CO., BOX 5120, TROY, OHIO, Phone FE 21223

"Manufacturers of the world's most complete line of arc welding equipment."

HOBART WELDERS · ELECTRODES

TELL US YOUR REQUIREMENTS
We'd like to be helpful in recommending the type welder best suited to meet your needs. No obligation, of course.

HOBART BROTHERS CO., BOX 6120, TROY, OHIO
Yes, I'd like to know more about these Hobart welders:
☐ "Husky Boy" ☐ "Contractor's Special" ☐ "Power/Weld" ☐ "Big Wheeler"
We'd like special information on_____
Name_____
Address_____
City_____ Zone_____ State_____

Circle 151 on Reader Service Card

Winter...

now is the time to properly light your construction hazards

USE THE

DIETZ 3 WAY HAZARD WARNING SYSTEM

It's Winter... long hours of darkness... hazardous road conditions!

Protect the public and you protect yourself. Proper lighting of your hazards may save you thousands in tragedies, bad publicity and lawsuits.

NEW! DIETZ HAZARD WARNING PLANNER

A Practical On-the-Job Tool! Quickly and easily shows how, when, and where to use each type of warning light for maximum safety under all weather conditions and all types of roads and speeds.

Send $1. for each Planner — personalized with your name

LANTERNS TORCHES VISI-FLASH

Use Dietz Visi-Flash Lights to alert the oncoming driver. Brightest, safest, most trouble-free flashers on the market. Warn: "Danger Ahead" for up to 1500 hours without changing batteries.

Use Dietz Lanterns to locate hazard in relation to driver's position. Show exact location, shape, extent, and boundaries of hazard area. Burn up to 100 hours.

Use Dietz Torches to guide driver around the hazard. Fully illuminate the danger in every weather. Burn up to 48 hours on low cost kerosene.

R. E. DIETZ COMPANY
Dept. 612 Syracuse 1, N.Y.

Go DIETZ and you go Safely

Circle 40 on Reader Service Card

CONTRACTS AWARDED... *continued*

dition in Boston, Mass. New England Mutual Life Insurance Co., 501 Boylston St., Boston. $7,500,000.

Alcan Pacific Co., Sacramento, Calif. Construct 500 Capehart housing units at Ford Ord, Calif. Corps of Engineers, 180 New Montgomery St., San Francisco, Calif. $7,778,560.

Green Construction Co., Winston Bros. & Tecon Corp., all of San Mateo, Calif. Construct a rockfill dam on the Calaveras River north of Stockton, Calif. Corps of Engineers, 1209 8th St., Sacramento, Calif. $7,613,855.

Peter Kiewit Sons' Co., Syracuse, N.Y. Construct section of highway from Malta to Saratoga Springs. State Dept. of Public Works, State Office Bldg., Albany, N.Y. $7,533,878.

Dinwiddie Construction Co., San Francisco, Calif. Erect a retail store and a two level parking area at the Hillsdale Shopping Center, in San Mateo, Calif. The Bohannon Organization, San Mateo. $6,500,000.

John Arborio, Inc., Poughkeepsie, N.Y. Construct section of highway near Kingston, N.Y. State Dept. of Public Works, Albany. $6,019,321.

John B. Pike & Son, Inc., and **Robert F. Hyland & Sons, Inc.,** both of Rochester, N.Y. A joint venture to construct an office building in Rochester. Midtown Holdings Corp., 501 Clinton Bldg. $6,000,000.

Virginia Engineering Co., Newport News, Va. Erect a seven-story hospital in Newport News. Riverside Hospital, 245 50th St. $5,640,000.

Hirano Brothers, Honolulu, Hawaii. Construct 250 housing units in Honolulu. Dr. Wonsik You, 18 1282 Queen Emma St. $5,000,000.

Fredrickson & Watson Construction Co., Oakland, Calif. Grade and pave 3.9-mi of four-lane freeway near the Benicia-Martinez Bridge. State Div. of Highways, 1120 N St. Sacramento, Calif. $4,198,239.

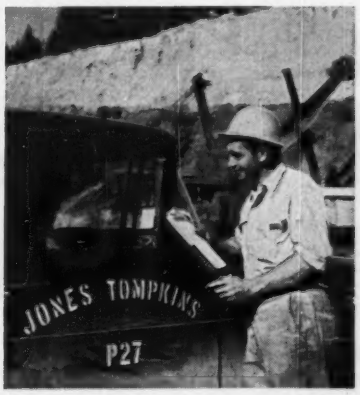
ENGINEER'S FIELD REPORT

PRODUCT **CHEVRON PRESSURE PRIMER SYSTEM**

FIRM **JONES-TOMKINS CO.** Cougar, Washington

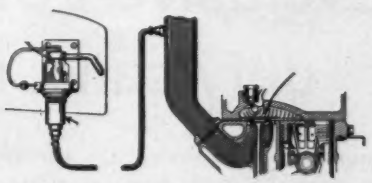
Special cartridge fires giant diesel in seconds

At world's highest earth-filled dam construction site near Woodland, Washington, three giant diesel shovels get immediate starts from Chevron Pressure Primer System, reports Jones-Tomkins, general contractors. System helps speed shovel's fill-borrowing operations for this $51,000,000 project. Five-year-old 4500 Manitowoc Speed Crane (above), powered by Caterpillar 350 h.p. V-12 D397 engine, operates 18 hours a day, six days a week, loading 21-yard dump trucks in just 70 seconds. Jones-Tomkins uses Standard fuels and lubricants exclusively on this job.



Chevron Pressure Primer Discharger mounted on instrument panel (left) operates satisfactorily despite heavy vibration, reports shovel foreman Henry Watson (right). "We've had absolutely no trouble with this system. The Chevron Pressure Primer System eliminates dust clogging and allows fluid to reach the cylinders quickly. It's the practical way we've found to get these rigs going."

Why Chevron Pressure Primer System assures fast starts



- Volatile Chevron Priming Fuel atomizes in induction system at all temperatures even at -65°F, no hand-pumping required.
- Pressure or weakest spark from engine fires mixture.
- Simple rugged air-tight discharger prevents Priming Fuel leakage.
- Small, fireproof, pressurized steel cartridges protect Priming Fuel from water and dirt.

For More Information or the name of your nearest distributor, write or call any of the companies listed.

CHEVRON

TRADEMARKS "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20

THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso

THE CALIFORNIA COMPANY, Denver 1, Colorado

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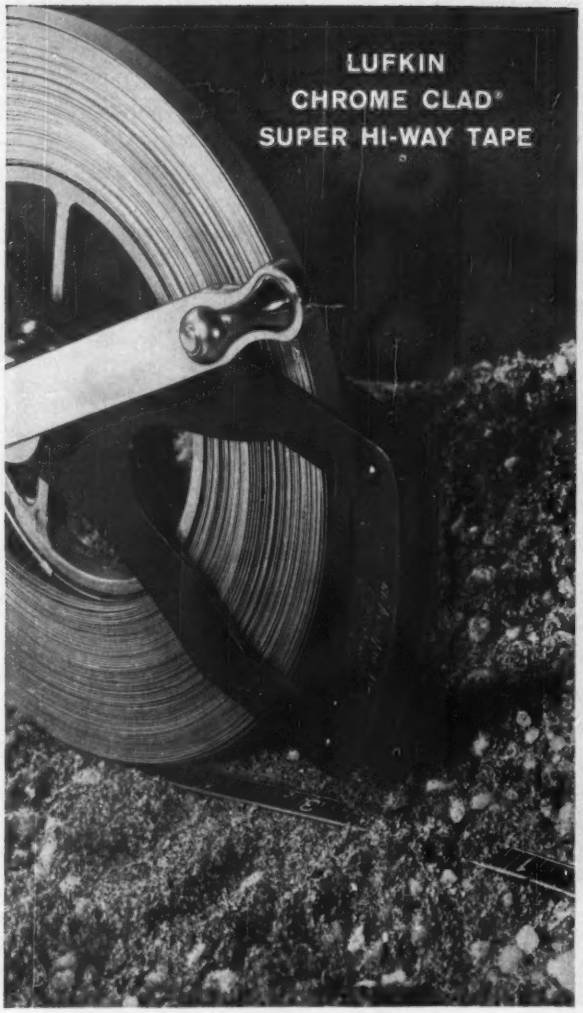

Exclusive LUFKIN Chrome Clad® lines defy sand, mud, grit, and years of use!

Engineers and construction workers swear by 'em. Because the bold, black markings are *bonded* to steel . . . protected by layer on layer of electroplating . . . topped by a final coat of chromium!

Exclusive quality features are yours in *all* Lufkin tapes. For example:

Lufkin Super Hi-Way (above, left) is built to *last.* A real drag tape. Raised markings and protective borders are part of the tape! Can't come off! And special steel resists kinking. Available in 100′, 200′ and 300′ lengths.

50-ft. Anchor Chrome Clad (above, right) is available with easy-to-read markings in feet, tenths and hundredths, in genuine-leather, hand-stitched case. The handiest thing you can carry, on job after job.

See your Engineering Supply House now . . . for the Lufkin tape that's designed for *your* kind of work.

Measure for measure, the finest made . . .

LUFKIN

SAGINAW, MICHIGAN

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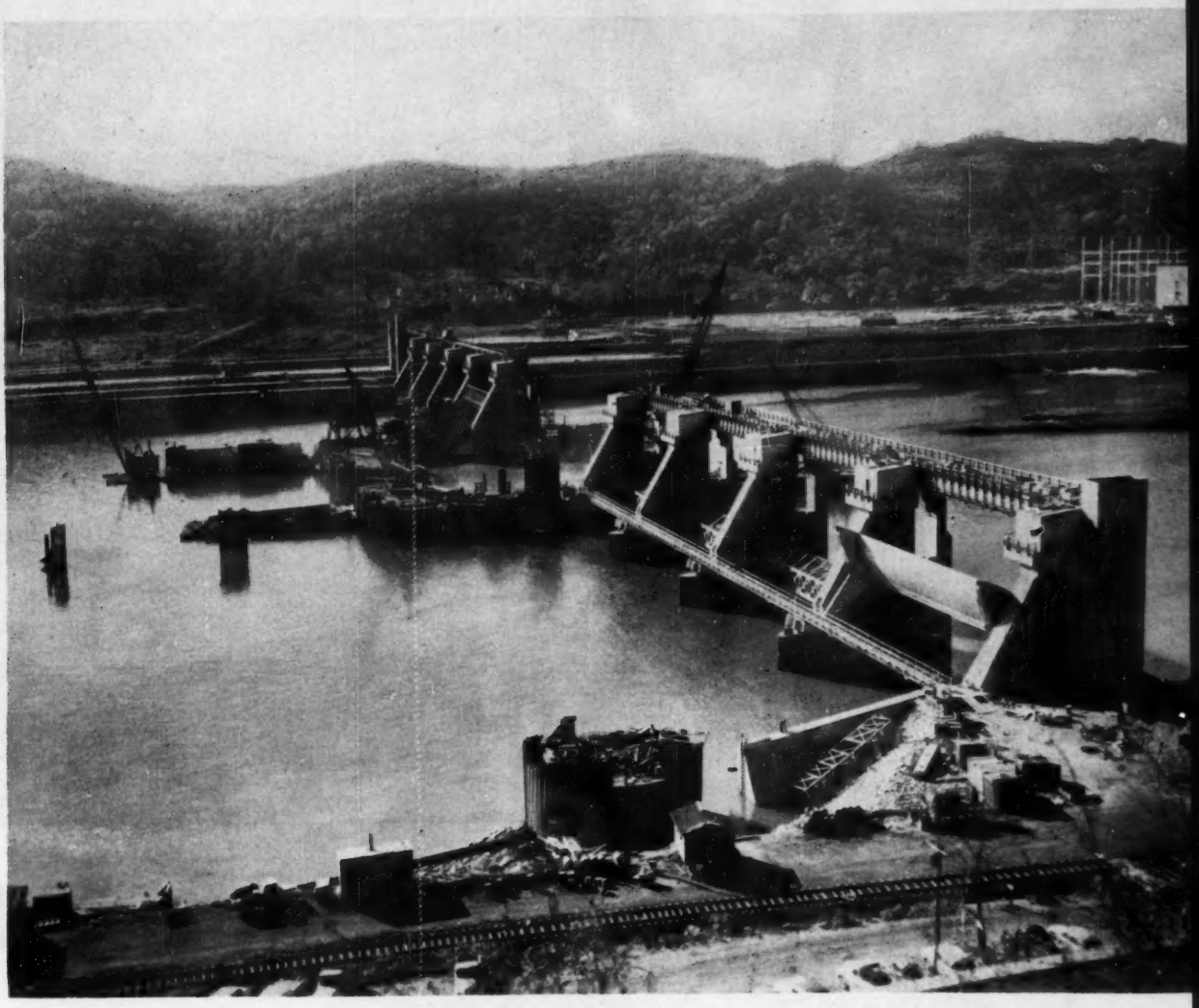
Crews Plug the Last Gap At New Cumberland Dam

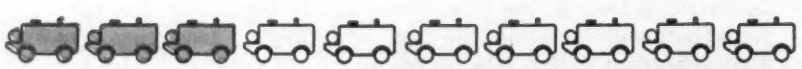
PICTURE OF THE MONTH



• Dravo Corp., of Pittsburgh, contractor for the $13.5-million New Cumberland Dam in the Ohio River at Stratton, Ohio, has completed both end sections of the dam. Now they're dewatering a cellular cofferdam within which they will construct the closure section. The last section will consist of two concrete piers and three gates. The finished dam will be 1,315 ft long and 115 ft high. There will be 11 bays, each with an electrically operated tainter gate. Two locks to pass river traffic around the dam can be seen on the opposite side of the river. New Cumberland project is one of 21 similar installations that Army Corps of Engineers is building to improve flood control and navigation on the Ohio River.

New Blue Brute drilling team—Worthington Blue Brute 900' rotary compressor with over/under design operates two Blue Brute crawler-mounted 4½" drills.

Why your next 900′ compressor will

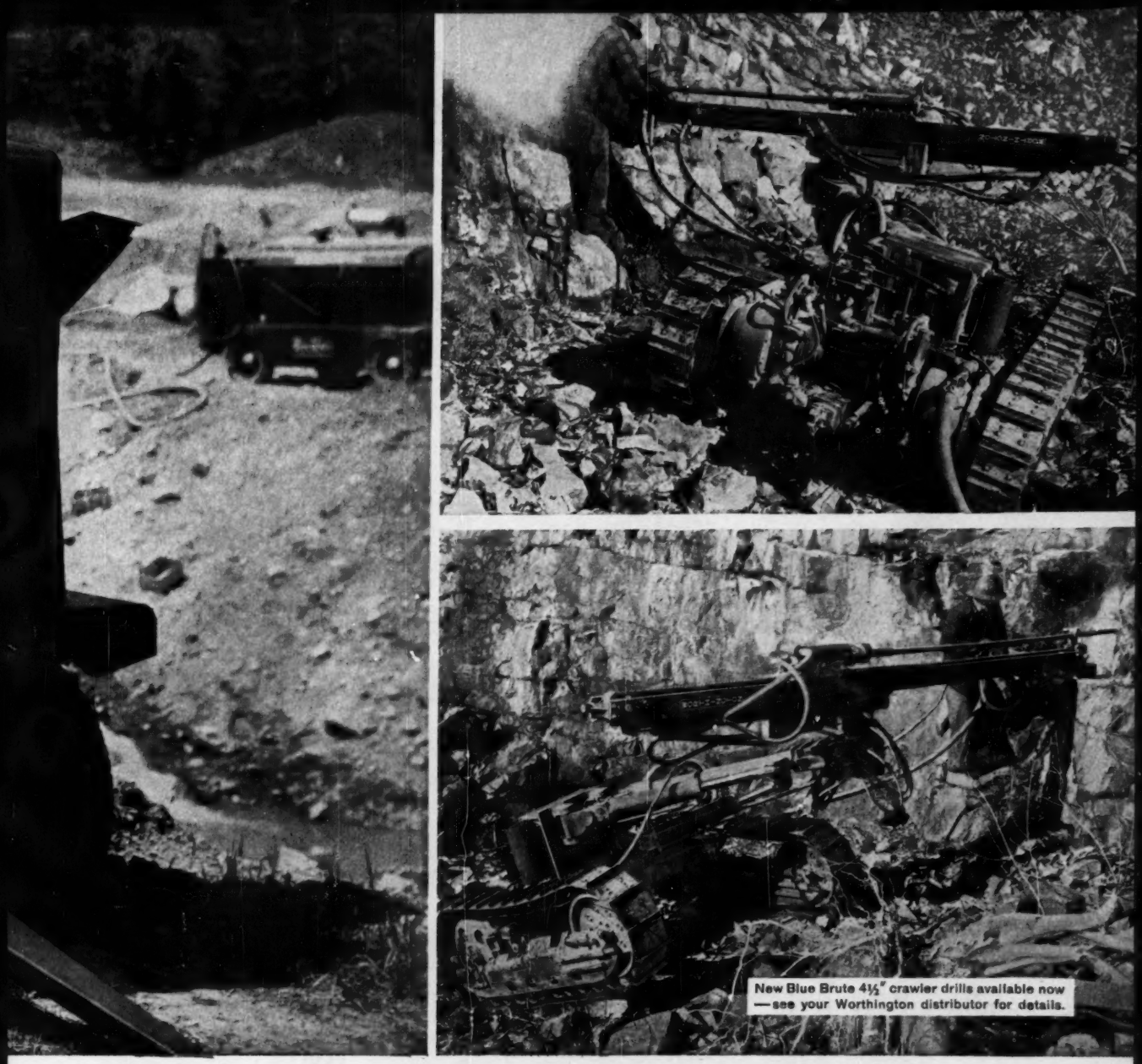


Most manufacturers build their small rotary compressors with end-to-end design. Only 3 out of 10 produced use over/under construction (shown in blue)...

Yet in the 900' size, more over/under units are sold than any other. The story opposite tells why...

If you looked inside every rotary compressor on the market you would find one major difference that separates the men from the boys.

A few manufacturers build their rotaries with over/under design: i.e. the compressor's second stage is directly underneath the first. This results in an improved rotary with many benefits. The cylinders are self-draining (this stops clogging) and easy to get at for repairs. All principal parts can be re-



most likely have OVER/UNDER design

moved for inspection and replaced in a hurry.

The superiority of over/under design is indicated by the fact that in the largest, most expensive size (the 900′ unit) *more over/under rotaries are bought than any other kind.* Yes, it takes over/under design to handle heavy jobs, such as operating *two* Worthington 4½" Blue Brute drills which get maximum drilling footage with least air consumption and less maintenance.

Worthington is one of the few manufacturers that offer over/under design in every compressor in its line. Worthington Blue Brute rotaries made with over/under design are built in 125′, 210′, 315′, 365′, 600′ and 900′ sizes. (A single-stage 85′ rotary is also available.) There's a complete line of Blue Brute drills, too—right through the 4½" size. Ask your nearby Blue Brute distributor for a demonstration. You'll find him in the Yellow Pages under "compressors." Or write Worthington Corporation, Dept. 60-24, Holyoke, Mass. In Canada: Worthington (Canada). Ltd., Brantford, Ontario.

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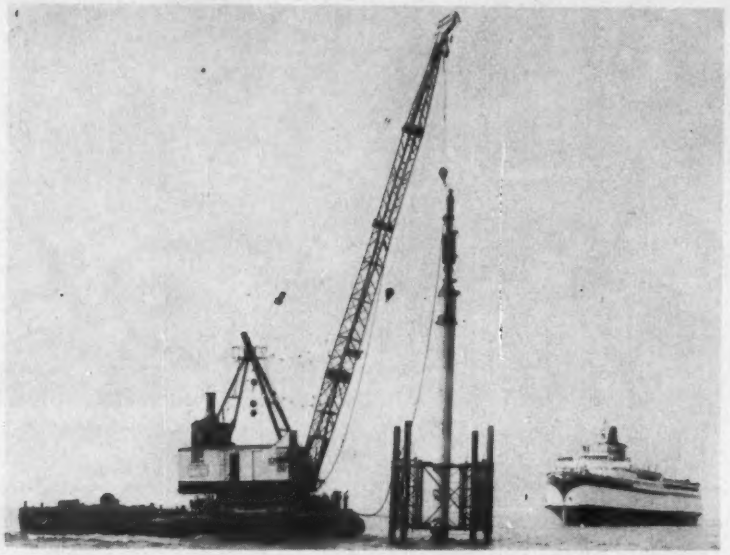
WORTHINGTON

Construction News in Pictures . . .



First Pile

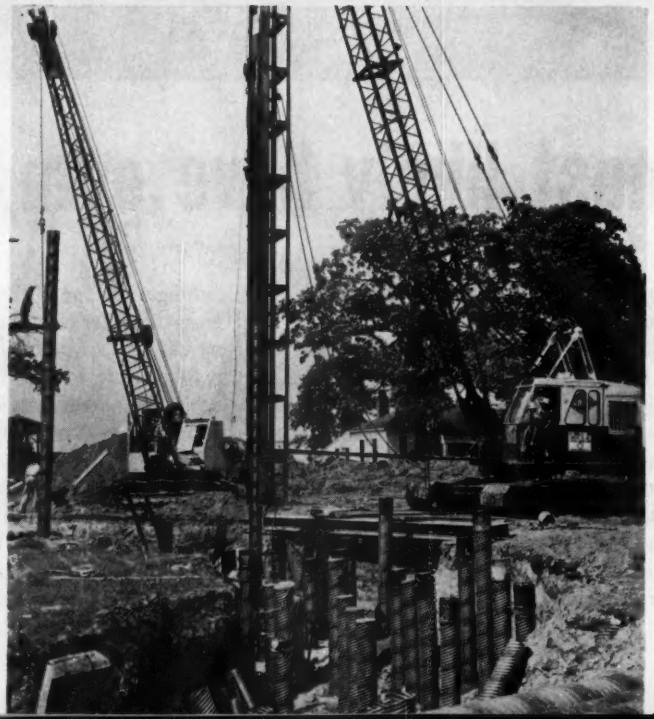
Floating crane drives the first pile for the world's longest bridge-tunnel—the 17½-mi crossing of Lower Chesapeake Bay. Pile is a 54-in.-dia, 120-ft-long, prestressed concrete cylinder. About 3,000 will be required for the job. The $200-million crossing is being built by a joint venture consisting of Tidewater-Merritt-Raymond-Kiewit.

Jointless Pavement

Paving train of C. J. Langenfelder & Son, Inc. lays 25-ft roadway of continuous pavement on a 6½-mi stretch of the Baltimore-Harrisburg Expressway. Without the usual expansion joints, the pavement surface is smoother. Cracking is controlled by heavy steel mats of continuous bar reinforcing steel supplied by the Bethlehem Steel Co.

Spiral Piles

Piles for the center pier foundation of a new 1,000,000-gal water storage tank in Raleigh, N. C., are driven to a depth of 25 ft by a Delmag D12 diesel hammer on a Lima crane. Piles are Hel-Cor shells, made by Armco. They are driven with a Hercules mandrel. Pile contractor is W. F. Brinkley & Sons Construction Co. of North Carolina.



DEMONSTRATIONS PROVE CURTISS-WRIGHT SUPERIORITY

CW-226—26 CU. YDS. STRUCK

CWD-221—35 TON CAPACITY

CW-220—20 CU. YDS. STRUCK

CWD-214—25 TON CAPACITY

CW-215—15 CU. YDS. STRUCK

CWD-321—35 TON CAPACITY

CW-28—8.2 CU. YDS. STRUCK

CWT-30—30 CU. YDS. STRUCK

CW-320—20 CU. YDS. STRUCK

CWT-8—8 CU. YDS. STRUCK

A

Greater Bowl Factors— Faster Cycles Give Top Profit Per Equipment Dollar

You know that the machine that moves the most dirt makes you the most money—but, how do you select that machine? By past experience? No, because constantly changing models, techniques and contract conditions make this method impractical . . . By appearances? No again! You wouldn't bid a job on surface appearances alone, so why risk your profits by buying a scraper by the same method.

This leaves only one practical solution to the problem of buying a scraper. That is actual performance evaluation in the field, with a decision based on load weights, bowl factors, cycle times and the many other points that add up to high production. As one contractor says: "We considered three other major makes of scrapers for the job, but comparison and field demonstrations proved Curtiss-Wright the best machine. We feel that the added production and high bowl factors will save several cents per yard for any contractor, as it has for us."

Savings such as this are the result of buying by proven performance. See these results for yourself with a Curtiss-Wright demonstration on your job.

A C-W MODEL FOR EVERY APPLICATION

Five self-propelled scrapers with capacities from 8 to 26 cu. yds. struck, up to 36 cu. yds. heaped . . . Three interchangeable rear dumpers with 25 and 35 ton capacities . . . Six tractor-drawn scrapers with capacities from 8 to 30 cu. yds. struck, up to 39 cu. yds. heaped . . . A total of 14 high-performance machines covering the complete range of practical earthmoving applications.

SOUTH BEND DIVISION

CURTISS-WRIGHT

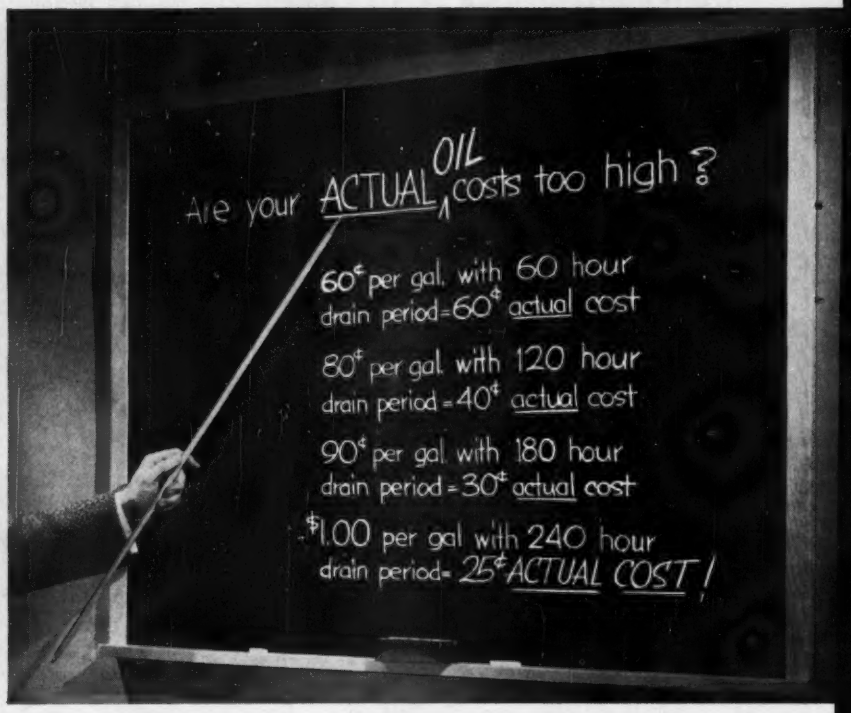
CORPORATION

SOUTH BEND, INDIANA

Distributed in Canada by Canadian Curtiss-Wright Ltd.

SAVE

25% to 50%...


Are your ACTUAL OIL costs too high?
60¢ per gal. with 60 hour drain period = 60¢ actual cost
80¢ per gal. with 120 hour drain period = 40¢ actual cost
90¢ per gal. with 180 hour drain period = 30¢ actual cost
$1.00 per gal. with 240 hour drain period = 25¢ ACTUAL COST!

on engine oil with D-A *controlled* lubrication!

You can drastically reduce your oil costs by extending your drain periods! Yes, you can save 25% to 50% on actual oil costs by using D-A "Extra-Treated" Diesel Oil and the free services of the D-A laboratory.

With D-A "Extra-Treated" Diesel Oil you can extend your drain periods, often far beyond the limits which you are now forced to use. The oil in your equipment will do more for you . . . better . . . and for a longer period of time. By sending occasional drain samples to the laboratory, you can establish maximum safe drain periods for any conditions in which you are operating. Your lubrication is controlled to *your* requirements.

D-A "Extra-Treated" Diesel Oil Lubricates Your Engines Better for several reasons:

❶ D-A's natural viscosity index is far superior to most competitive oils. This means that D-A "Extra-Treated" Diesel Oil thins out less with increase in temperature, offers more protection to engines under all conditions of heat, yet lubricates cold engines properly.

❷ D-A uses superior additives, and more of them. Engines don't become "additive starved" with D-A "Extra-Treated" Diesel Oil.

Base oils seldom break down in service; more often, the additives are used up during operation. When they are gone, they can no longer help to protect an engine. D-A insures that the additives stay in the oil longer by using more and better additives to begin with. You extend your drain pe-

◀ *Circle 47 on Reader Service Card*

riods because you *know* that your oil is still able to protect your equipment.

❸ D-A oxidation inhibitors and detergent additives keep your engines cleaner. Varnish formation and sludge deposits are prevented by D-A's new types of high temperature anti-oxidants. Carbon and other inescapable products of diesel engine operation are held in suspension.

❹ D-A "Extra-Treated" Diesel Oil protects your engine from acid corrosion, one of the greatest known enemies of long engine life. Today approximately one-third of the diesel fuel oil manufactured contains more than .4% sulfur.

During combustion, sulfur is converted to sulfuric acid. When fuel oil contains .5% sulfur, acids are formed at the rate of approximately *one pound* for every sixteen gallons of fuel burned.

Extra amounts of D-A corrosion inhibitors assure maximum protection against excessive parts wear and possible engine failure. *D-A "Extra-Treated" Diesel Oil will neutralize the harmful effect of sulfur in fuel even when present in concentrations of up to 3%.*

Why you *must* have Laboratory Service to Extend Drain Periods

You can save time and money by using D-A "Extra-Treated" Diesel Oil and thereby greatly extending your drain periods. But you must *know* how far you may safely lengthen the drain interval! To do this, D-A's free laboratory analysis is at your service. This analysis is concerned principally with the following:

❶ **SULFUR CONTENT OF FUEL**
The more sulfur that exists in the fuel you are using, the sooner the alkaline reserve and detergent additives are depleted, because sulfur creates acids and hinders clean combustion. Therefore, it is essential to know just how much sulfur is present.

❷ **FUEL DILUTION**
Any oil will eventually become contaminated with raw fuel deposited in the crankcase during operation. When the amount of dilution becomes too great, excessive bearing wear and piston scuffing will result. *No oil* should be used after dilution approaches 15%.

❸ **MOISTURE**
Moisture in the oil, another inevitable by-product of combustion, destroys the oil's detergency reserve and lowers film strength. If moisture content is more than 2%, excessive wear or metal scoring will follow.

❹ **ACID BUILD-UP**
All *good* engine oils are alkaline when manufactured (some more so than others), but a continuous flow of combustion acids eventually neutralizes the alkalinity. When this happens THE OIL MUST BE DRAINED IMMEDIATELY, before combustion acids cause corrosion, excessive cylinder and ring wear.

❺ **FOREIGN CONTAMINANTS**
When sufficient abrasive material, such as dirt, dust or sand, has bypassed the oil cleaner and is flowing through the engine, excessive wear begins and must be stopped immediately, before expensive repairs are necessary.

When you buy D-A Diesel Oil, you buy controlled lubrication, designed specifically for *your* operation and taking into account all of your particular problems. Your drain periods will be extended to your maximum advantage: your equipment will be protected . . . you will get the utmost from your lubrication dollars . . . and this service will be yours FREE.

D-A controlled *safe* lubrication will bring you real savings

. . . SAVINGS OF 25% TO 50%. The best way to save money on oil is to buy the best oil—backed by complete laboratory analysis service. The most dangerous, most expensive thing you can do is to buy "any old oil" and to remain ignorant of what is happening inside your engine.

D-A will be glad to help you solve your lubrication problems and show you how you can get the best lubrication for the least cost.

Lubricating heavy-duty equipment across the nation since 1919.

D-A LUBRICANT COMPANY, INC. • INDIANAPOLIS 23, IND.

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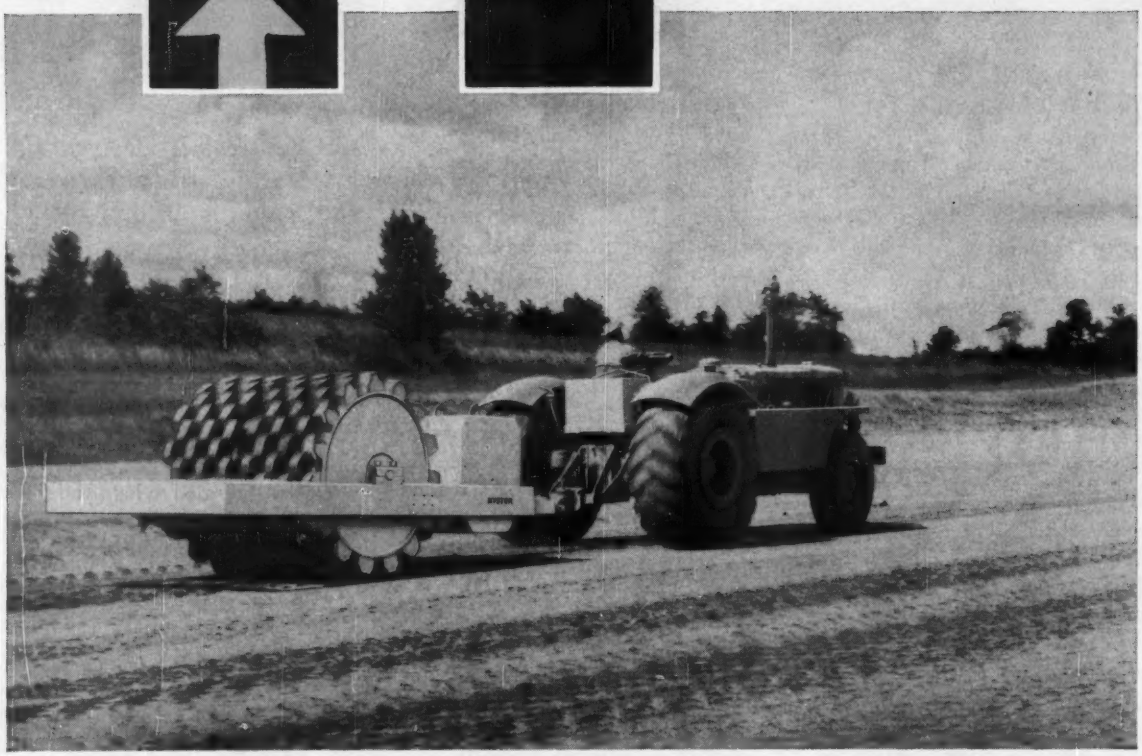
HYSTER



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- High speed rolling cuts compaction costs to less than three cents per cubic yard.
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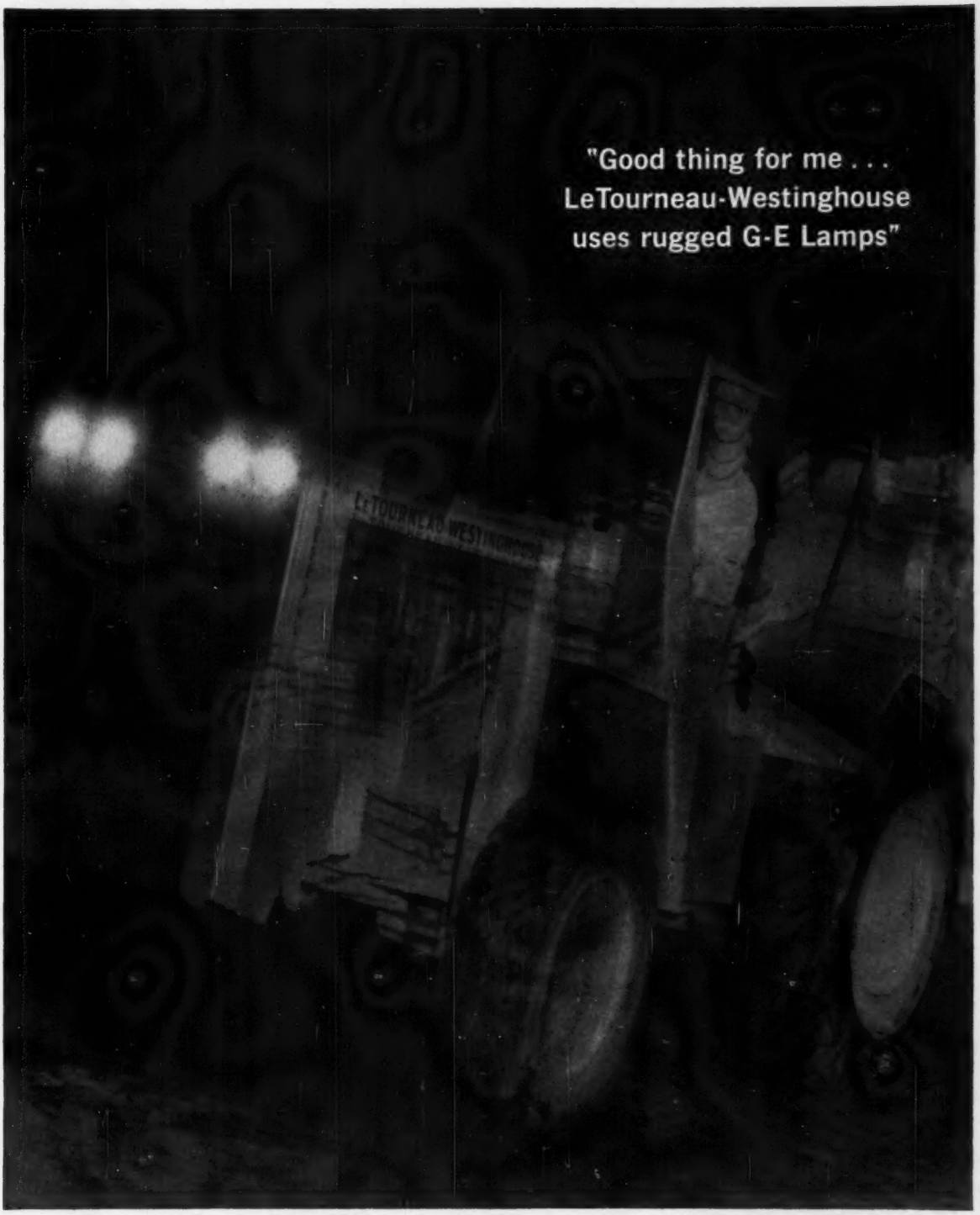

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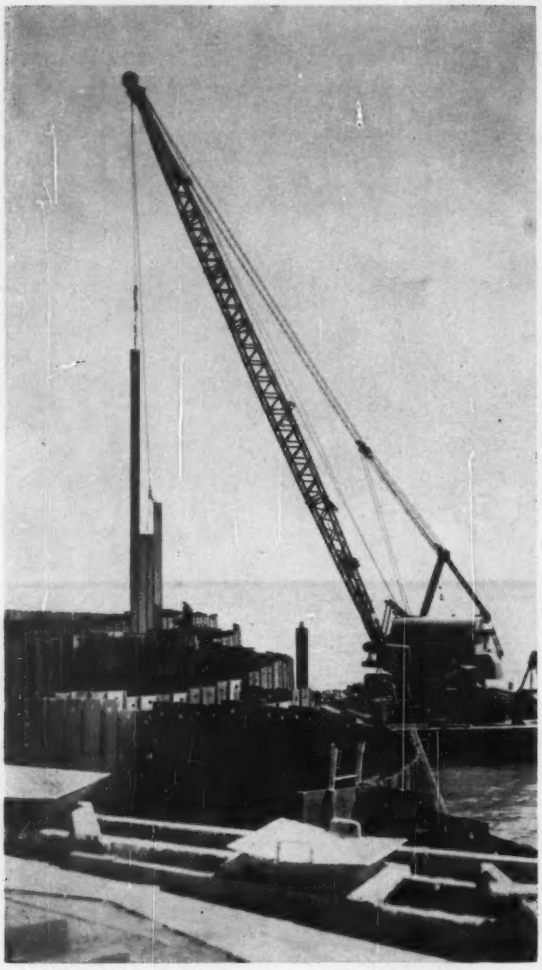
Construction 'Round the World



In Canada

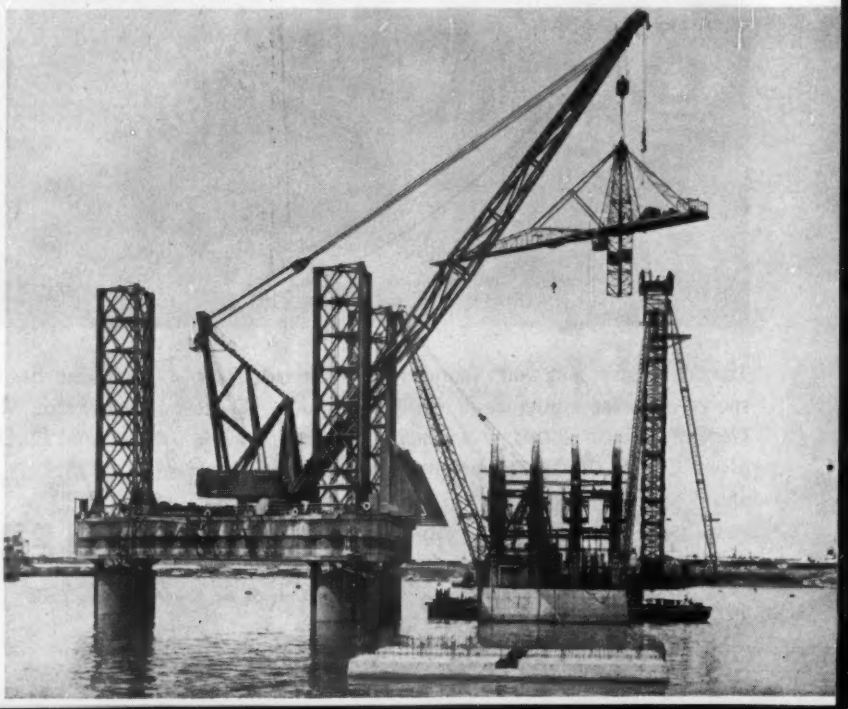
A Manitowoc crane lowers 50-ft-long steel sheet piles into 35 ft of water during the construction of cells for a dock in Lake Ontario. Next, the piles will be driven to bedrock. Each of the 22 cells in the completed dock will contain 700 yd of concrete. Dravo of Canada is building the dock and a causeway as part of a Toronto power plant.

In Tunisia

Tunisian workmen operate four drills that make blast holes for a pipeline trench through a rocky section of the Sahara. Drills are mounted on a spreader that is suspended from the end of a sideboom on a tractor. Bechtel Corp. constructed the 480-mi, 24-in. crude oil pipeline for Compagnie des Transports par Pipe-Lines au Sahara.

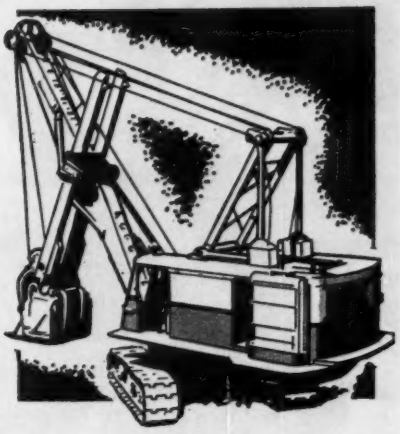
In Venezuela

A 250-ton capacity crane mounted on a self-elevating, mobile island is rounding out its first year of service on the Lake Maracaibo Bridge. Here it reaches across newly completed piers to erect a hammerhead crane. The island crane, which was fabricated by R. G. LeTourneau, Inc., handles forms and precast sections for the concrete bridge.



Question for crane and excavator owners:

Is torque converter drive "better" or only "different"?



When you buy an engine, you're actually buying "horsepower." To deliver the horsepower you paid for, the engine has to operate at or near its governed speed. Every time the engine lugs down under load, it's like money out of your pocket, because you're being *robbed* of horsepower.

In excavator work, particularly in back-hoe and shovel digging, the operator works more or less "by ear," depending on engine noise to find the best bite. This requires careful crowd control to keep from killing the engine. The deeper the bite, the more the engine lugs—with a sacrifice of digging power. The fixed gear ratio in a mechanical shovel drive cannot prevent this power loss.

Keeping this fact in mind, let's take a look at a shovel operation using straight mechanical drive. As the shovel bites in, the load reduces machinery rpm and the engine lugs down. So the operator moves his crowd control trying to find a better bite that will let the engine regain its governed speed. By now, input torque may have already dropped along with rpms. So again the engine lugs as it shoulders the new load—setting up shocks and vibrations throughout the drive train, as well as giving the operator a "workout" which may be repeated hundreds of times a day. From a dollars-and-cents point of view, it's plain inefficient.

Cut-Depth Guesswork Gone

Now let's take the same job and put a torque converter behind the engine. As before, when the cut gets deep, the dipper will slow down, but the engine does *not* lug down. The dipper becomes filled in a shorter distance at little or no increase in filling time. The operator can dig deeper faster because he uses the horsepower advantage gained from an engine running at near constant speed, delivering more horsepower—through the torque converter—to the deck machinery.

It's all done automatically by the torque converter's unique ability to increase engine torque output in the exact ratio demanded by the load. By eliminating engine lugging, the converter gets more work done faster.

"Force without motion" is another advantage of torque converter drive. In crane erection work, any size load can be lifted "on the throttle" and held in mid-air without swaying. This ability to inch and hold under power makes for safety and accuracy in spotting.

Where Did the "Snap" Go?

Ever hear an operator complain that a converter-equipped machine lacked "snap"? He's right as rain, but it's no cause for complaint. The "snap" he's accustomed to is the impact energy caused by quick drum speed change, a common occurrence with mechanical drive. Any sudden load increase imposes terrific shocks on the power train as moving parts are caught in an unyielding steel-clad grip. The resulting stress may be *ten* times that of normal operation. Most machinery downtime can be directly traced to these shock loads.

In a torque converter there's no metal-to-metal connection between driving and driven equipment. The hydraulic fluid has the magic power to soak up shocks and jolts . . . they cannot pass through the converter, either from engine to deck machinery or vice versa. Cable life is doubled and often tripled as a result of this smooth output power.

Profit is the Pay-off

Torque converters pay off across the board. They increase machine average power loading as well as work output per hour. They eliminate the shock loads that lead to high maintenance costs. And they're a real time and equipment saver when it comes to training new operators.

If you're planning to purchase a new machine or repower an old one, torque converter drive will guarantee a bigger return on your investment dollar. Ask your dealer for a demonstration, and be sure to specify Twin Disc — first and foremost name in torque converters. Twin Disc Converters — single-stage or three-stage from 30 to 1000 horsepower — are standard or optional equipment on every make of crane and shovel.

TWIN DISC
POWER TRANSMISSION EQUIPMENT

TWIN DISC
Torque Converters

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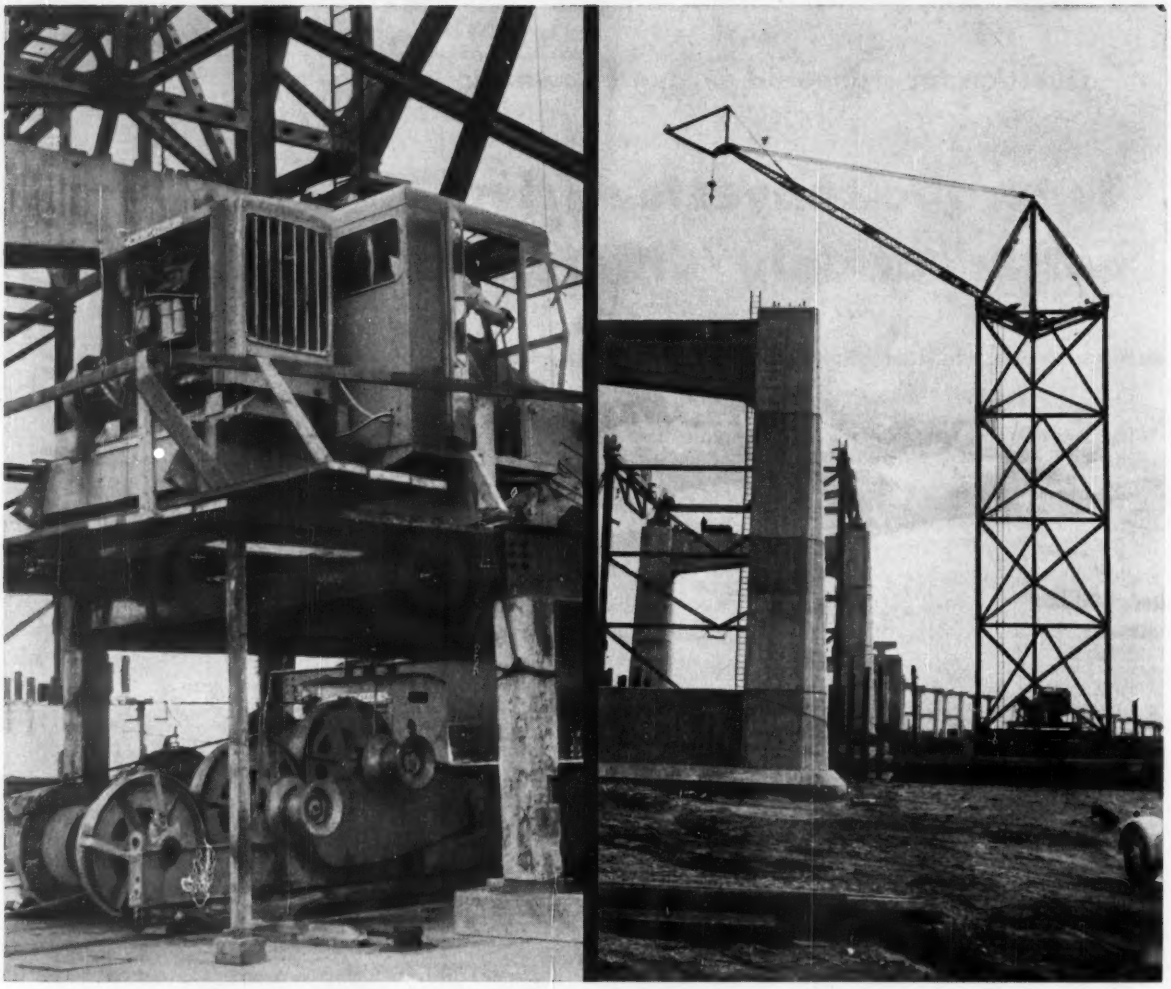

AMERICAN BRIDGE DOUBLE DECKS CLYDE HOISTS ON BARGE MOUNTED TOWER DERRICK

The two Clyde Hoists used by American Bridge Division of U.S. Steel Corp. were years apart in manufacture. In age and appearance they were very different. But in the important measurements of hoist value they are identical twins.

Both Clyde Hoists were carefully engineered, trademarked by integrity of manufacture and performance that equaled or exceeded claim or promise. Both were carefully designed and ruggedly constructed to lower material handling costs with greatest possible safety; to require minimum maintenance and to offer maximum accessibility for servicing.

Clyde has been building good hoists . . . the best hoists . . . for more than seventy-five years.

Write for Bulletin 34A for specifications on the complete line of Clyde Hoists

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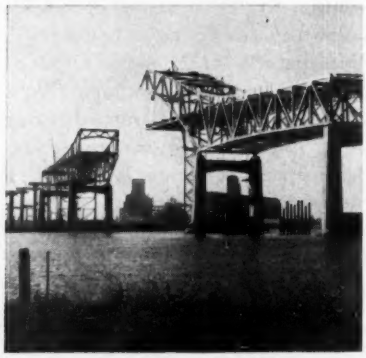


American Bridge Division, United States Steel Corporation has a 165 foot, barge-mounted tower derrick to set steel on the center span of the new high bridge at Duluth-Superior, western terminal of the St. Lawrence Seaway. Two Clyde Hoists were used, one to operate the derrick and one to position the barge.

MERRY CHRISTMAS AND A MOST HAPPY NEW YEAR

Construction Methods AND EQUIPMENT

DECEMBER, 1960

VOLUME 42 • NUMBER 12

HENRY T. PEREZ, Editor

Highways at the Crossroads

NEXT YEAR the Congress intends to take a long and comprehensive look into the federal-aid highway program. That program's future may well be determined by the effect of Bureau of Public Roads reports, including revised cost estimates, due to be presented to Congress in January. But the legislators are sure to be influenced, too, by investigating-committee disclosures of irregularities in the program.

It is in this area that each of us with a stake in the construction industry can lend a hand—not by trying to hide or ignore irregularities, but rather by pointing up the benefits of an orderly completion of the great highway program, only an infinitesimal part of which has been touched by scandal.

A prime way to help is by supporting the Better Highways Information Foundation. One of the worthy functions of this industry-wide non-profit organization is to improve public recognition of highway needs, problems, and construction progress. Unless the public is kept informed of these, and made aware of the enormous benefits of an adequate highway network, its apathy—or even downright hostility—is sure to affect Congress' thinking.

It is good news that former U. S. Commissioner of Public Roads Ellis L. Armstrong, well-known and respected on Capitol Hill, has accepted the BHIF presidency. But organizations and their staffs cannot do the job alone. Now, more than ever before, it will take all of us —individualy as well as collectively—to impress upon the Congress and the public the necessity for an orderly and rapid completion of our highway network.

CASTING BEDS—Compacted earth in a pit is shaped to conform to the curvature of the arches, each of which is cast in two halves.

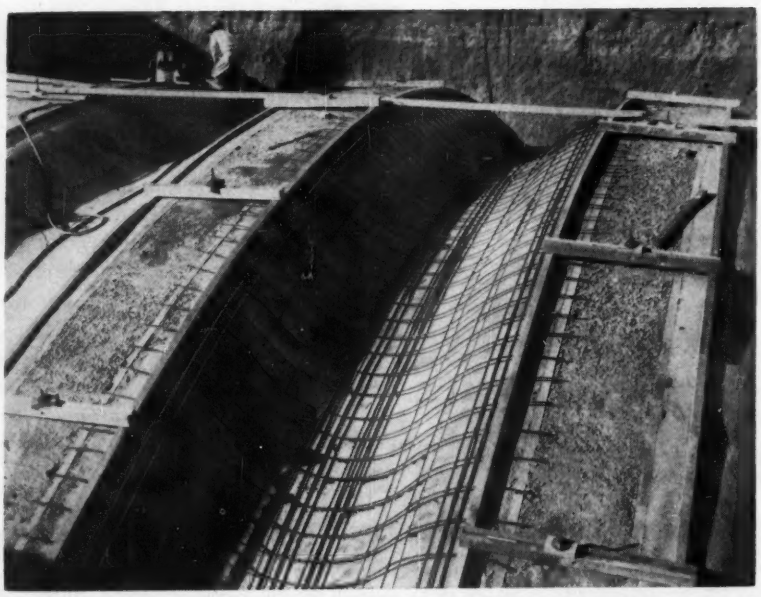
To erect an 18,600-sq-ft skating arena, a contractor precasts nine pairs of arches in earth forms dug in a pit at the job site.

Shaped Earth Is

EARTH MOLDS serve as forms and casting beds for thin-shell concrete structural elements for a corrugated toroid arch structure in Tarzana, Calif. It will house a 70x140-ft ice skating rink.

The unusual structure resembles a Quonset hut, except that the corrugations are much bigger, each measuring about 10 ft in width. Also, the sides of the building and its roof line are curved. At the center, it is 32 ft high and 100 ft wide; at the ends the height is only 24 ft and the width 91½ ft. The building is 180 ft long.

Eighteen parallel arches, each constituting one corrugation, make up the structure. It is symmetrical about its midpoint, and corresponding arches in either half of the building are identical. There are nine pairs of arches, and each arch is made up of two halves. This meant that it would be convenient to cast four identical sections side by side. And because the lengths of arches



FINISHED FORMS—Thin concrete layer over the earth gives the forms a smooth surface. Longitudinal steel is tied to transverse bars positioned by screed boards.

CONCRETING—Transit mixer at edge of pit discharges concrete directly into the forms. Concrete is dumped into bottom of forms; shoveled up the sides by hand. ►

varied, the sections could be cast in a stack with the longest units on the bottom.

The contractor, Rains-McLellan Corp. of Los Angeles, prepared four casting beds in an area that later became the arena's parking lot. A Gradall dug a 50x70-ft pit that was 12 ft deep at the sides and had an arched mound in its center. The mound was shaped to conform roughly to the doubly curved design of the arches. The earth was covered with concrete and plastered smooth.

One advantage of precasting the shell in a pit was that cranes were not necessary for the pouring operation. Trucks standing at the edge of the pit could discharge concrete directly into the forms.

The half-arch panel sections 4 in. thick were cast, pancake fashion, in four piles of nine each. The longest panels for the middle of the structure were cast at the bottom. These are 54 ft long, measured along the arch. The length of successively cast panels decreases in 4-in. increments to fit the span requirements of arches at the ends of the arena. The shortest arches are 51 ft 4 in. long. Each half-arch panel weighs about 14 tons, and the weight difference between the longest and the shortest is less than 100 lb.

Casting proceeded at the rate of two panels a day. One work crew was placing and finishing the concrete for two panels, while another crew was preparing forms and reinforcing for the other two panels.

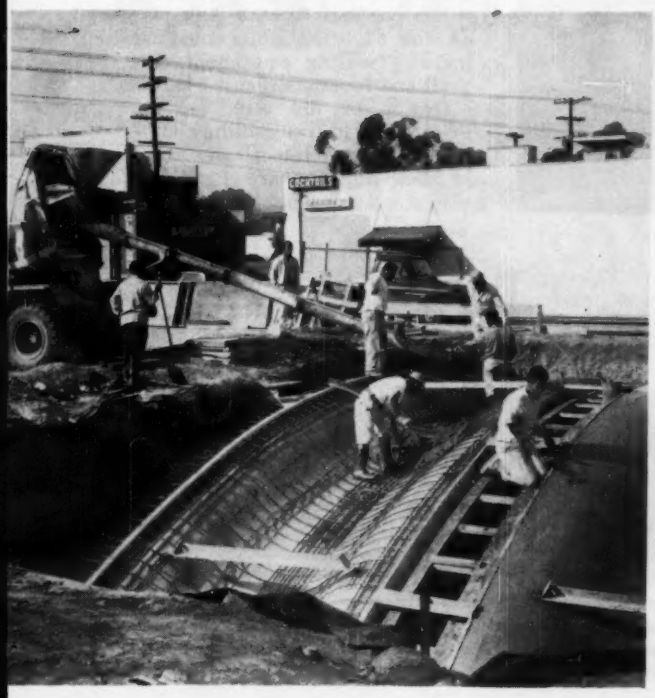
Reinforcing bars were prefabricated and installed by Rebar Contractors Inc., Los Angeles. Transverse bars were held in place by 2x3 screed boards running along the sides of the forms. Several pairs of 2x3's anchored to the ground between the forms held the screed boards in place. Longitudinal bars were tied to the transverse ones. No concrete chairs were used. In addition to the reinforcing the contractor added three pairs of inserts to hold 4x4 angles for lifting the panels. And he inserted welding plates at the crown ends of the panels for connecting them during erection.

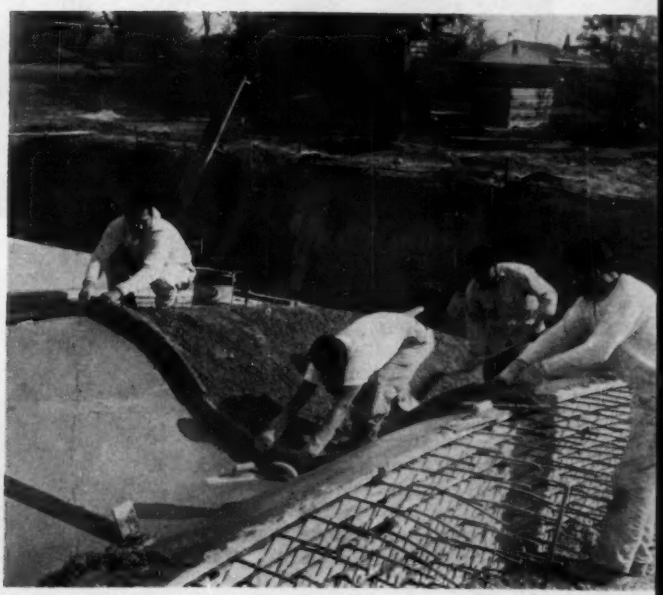
Concrete was poured into the depressed center of the forms, and workmen shoveled it up the sloping sides. Then a shaped wooden screed encased in metal was dragged the length of the form, rough-finishing the concrete. The screed followed the arched contour of the panel outlined by the screed boards. Finally, hand troweling finished the panel.

When the concrete was set, its surface was coated with Thompson's Water Seal, and the forms and reinforcing for the next smaller arch section were put in place. The concrete, with Pozzolith additive, was designed for a strength of 4,000 psi.

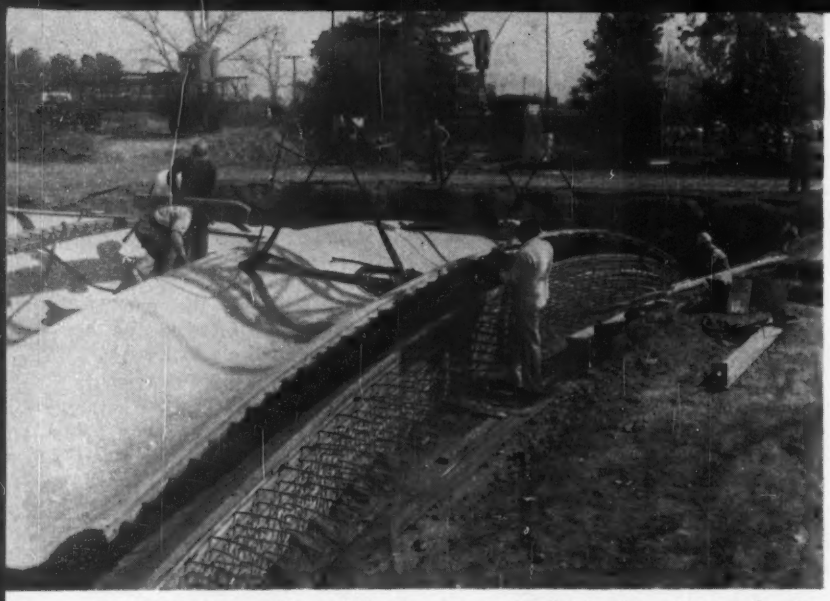
Two 45-ton American truck cranes with 60-ft booms handled erection of the arches. Erecting the first half of the arena was simple because the smallest arches for the ends of the building were at the tops of the stacks of precast panels. Each crane simply lifted the panel off the top of the stack and carried it

Casting Bed for Roof Arches





FINISHING — All finishing operations are done by hand. A shaped wooden screed encased in steel rough-finishes the concrete, and hand troweling completes the operation.



ERECTION—Crane picks up half-arch section and walks it onto position at the site.

IN POSITION—Two cranes hold companion half-arches in position while welders connect steel plates imbedded in the ends of each panel. Each arch is self-supporting.

CASTING BED . . . *continued*

to the building site. There the cranes placed the lower ends of the arch in special slots in the angled face of the grade beam and held the panels with their crown ends butted until the welding plates could be joined. Then the arch became self-supporting, and the cranes went back for the companion pieces for the next arch.

When they reached the middle of the building, it was necessary to reverse the procedure and work from the center to the end because the cranes could not work under the shell. But the big panels were on the bottom of the stack in the casting bed. So the cranes lifted eight panels off the stack and laid them aside, repeating this procedure until all arches were erected.

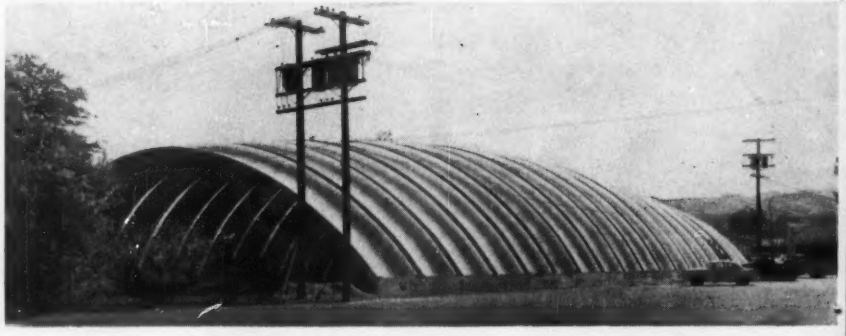
After all panels were in place, the open strips between them were completed. These gaps were about 16 in. wide with transverse reinforcing rods from the arch panels extending into the strips. The reinforcing rods were spliced by welding and the gaps closed by sprayed concrete. Temporary plywood backings served as forms for this operation. The plywood was bolted to 2x4's that bridged the gap on the outside of the shell.

At this time also the bases of the arches were grouted at the foundations. The foundations consist of a curved grade beam that rests on top of poured-in-place piles. These are 20 in. in dia and 23 ft long. There is one pile under each end of each arch.

Grade beams on opposite sides of the arena are tied together with 1⅜-in. tie rods that extend between piles. The tie rods are encased in concrete and are slightly below grade. They were placed in trenches and tied to the grade beams during concreting.

The contract for the rink was let for $108,000; this does not include freezing equipment. The shell and foundation cost $49,000.

Owner of the rink is Ron Priestley, a former skating champion. The architect was Carl Maston, and Richard Bradshaw was structural engineer.



THE ARENA—Arches with greatest span and rise are in the center of the building; dimensions decrease toward the ends forming a curved outline for the sides and the roof.

SAND DRAIN BUILDERS — Tractor shovel fills sand drain through funnel fitted in top of casing. The tractor shovel also drills holes through the sawdust so pile driver can sink the casings.

Drill Rig Helps Sink Sand Drains Through Sawdust Fill

A SAWDUST TRAIL extending over a peat bog supports a section of the Trans-Canada Highway near Vancouver, B. C. Sand drains extend through the sawdust fill, which is topped by a heavy surcharge of sand to consolidate the underlying soft clay and peat that runs to depths of 80 ft.

Thickness of the sawdust layer ranges between 10 and 17 ft. It will be permanently submerged below the water table after a sand surcharge has been placed on top of it and settlement takes place. About 8 ft of sand is placed during construction; the top 5 ft of this is surcharge that stays in place for about 6 mo to 1 yr and is removed before the roadway is paved.

Placing the sawdust is a simple task. The contractor, John Laing & Son (Canada), Ltd., hauls the sawdust to the site by truck and spreads and compacts it with a dozer. The sawdust layer is strong enough to support heavy equipment that comes in to install the sand drains.

And here's where the contractor ran into difficulties. The pile driver installing the 12-in.-dia casings for the drains could not drive them because they merely bounced on the spongy sawdust.

To beat the sawdust, Fraser River Pile Driving Co., Ltd., of New Westminster, subcontractor on the sand drains, brought in a shop-built drill rig that bores 14-in. holes through the sawdust so piles can be started easily.

The auger-type drill is mounted on a Callahan fork lift attachment installed on the rear of a Michigan 75A tractor shovel. The attachment has a 14-ft mast and is bolted to the counterweight of the 75A. The drill itself is mounted in a frame made of 1-in. pipe attached to the forks.

A Dowty hydraulic motor delivering 10 hp at 3,200 rpm drives the auger. The standard pump on the tractor shovel supplies hydraulic power. Total cost of the drill attachment, including labor, is about $4,000.

When drilling through the sawdust, a hole is sunk with a 12-ft auger section. Where necessary in deeper areas, a 6-ft flight is added to get through the entire sawdust layer.

continued on next page

FRONT END—Funnel hooks onto a bracket on the tractor shovel bucket for moving from one sand drain casing to the next.

REAR END—Auger-type drill is mounted on fork lift attachment that is bolted to the tractor shovel counterweight.

SAWDUST FILL... *continued*

Right behind the tractor shovel comes the pile driver. It is a Bay City crane with a 70-ft boom and 62-ft leads. The drop hammer weighs 3,200 lb. That's enough weight to push the pipe as much as 20 ft into the soft peat with one blow. The sand drain casings are about 65 ft long and are driven in a triangular pattern on 13-ft centers.

To keep the peat and clay from entering the casing during driving, a plug, or shoe, is installed at the bottom of the pipe. The shoe is nothing more than a flat cover made of two circular pieces of steel plate. The diameter of one piece is equal to the inside diameter of the casing, the other piece is slightly larger. The two pieces are welded together and act as a lid that fits the bottom of the pipe.

Each shoe costs about $8, and the contractor did not want to lose one with each of the 6,000 casings. So he devised a method to retrieve the shoe after the casing is driven. The technique enabled the sand drain subcontractor to drive all of the casings using only three shoes.

At the start of the driving, the shoe is wired onto the casing with baling wire. It is just strong enough to keep the shoe in place, yet it can be broken with little effort to detach the shoe from the casing. Also attached to the shoe is a ½-in. cable that runs down the outside of the casing and is sunk into the ground as the casing is driven.

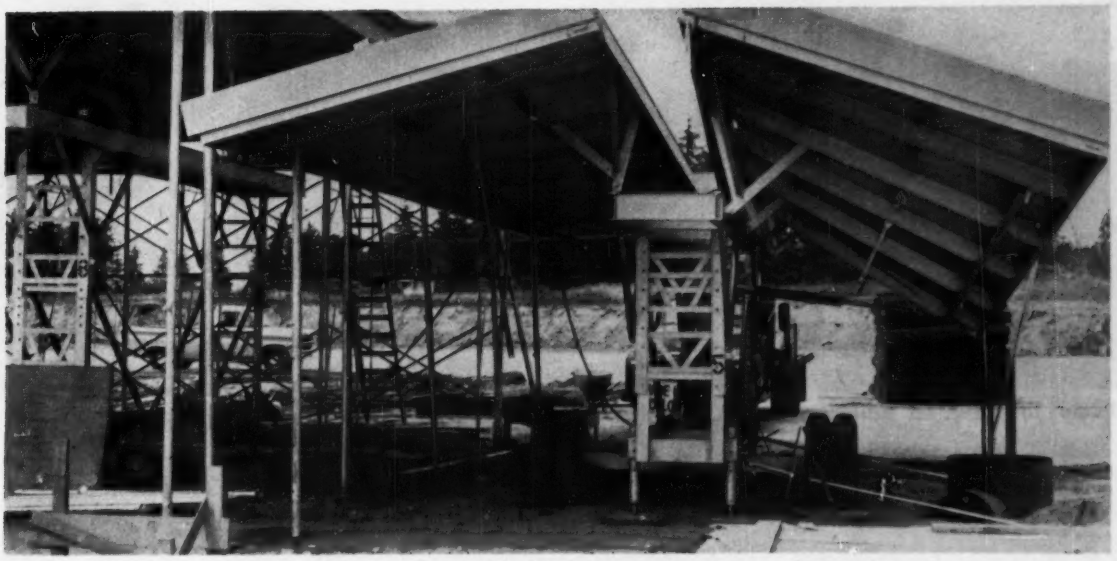
After the casing is driven to the required depth and filled with sand, a cover similar to one on a pressure cooker is installed on top of the pipe. The cover is fitted with a quick-connect nipple to which an air hose is connected. About 20 psi of compressed air supplied by a LeRoi Tractair is applied to the casing. The pressure lifts the casing about 6 to 8 in. so the shoe on the bottom can be freed and pulled out of the ground with the cable. Then the casing is pulled, with pressure maintained to force out the sand and eliminate all voids.

Filling the casings with sand is another job assigned to the Michigan tractor shovel. Its bucket is equipped with a bracket with which it can pick up and carry a special 1½-yd funnel. A pipe at the bottom of the funnel fits inside the sand drain casing and holds the unit in place while the tractor shovel charges it with sand.

Two bucketfuls are all that's needed to fill the pipe. As soon as a casing is full, the 75A goes back to drilling more holes ahead of the pile driver. And the two rigs continue to play leap frog throughout the day.

With four men, the two rigs, and three casings, Fraser River Pile Driving Co. is completing an average of 900 ft of sand drain in an 8-hr shift. The crew includes one laborer, two men driving the piles, and one operating the tractor shovel. The 75A can drill one hole through the sawdust and backfill one casing in 20 min. But the two operations are not always consecutive, because the tractor shovel has to take time out to move sections of the casing within reach of the pile driver as it moves ahead. For this, the bucket of the Michigan tractor shovel is equipped with a lifting hook.

TOW—Form unit consisting of two folding panels mounted on a trailer is ready to form half of a 36-ft-square hyperbolic-paraboloid umbrella.



UNFOLD—Hydraulic mechanism powered by electric motor lifts 9x36-ft form panels into position for concrete pour.

Folding Forms Speed Roof Pour

AN ASSEMBLY LINE technique incorporating easily portable collapsible forms permits a West Coast contractor to shave erection and stripping costs to 60¢ per sq ft while pouring five 36-ft-square thin-shell roof sections a week.

The job is a $1.6-million, 136,000-sq-ft electronics plant near Seattle for United Control Corp. A total of 63 hyperbolic-paraboloid umbrellas form the 2-in. thin-shell roof of the plant. Height above floor level of each umbrella is 12 ft at the edges. A 9-ft column 16 in. in dia supports each unit at the center. The floor slab will be poured and the precast wall panels tilted-up into place after completion of the roof.

The contractor is using five sets of hydraulically operated collapsible forms. Each of the two form units making up a set consists of two collapsible form panels mounted on a trailer. One of the units in each pair includes an hydraulic "tree" containing the mechanism that lifts the panels into position. This is interchangeable between the two units.

Each collapsible form panel measures 9x36 ft and forms a quarter of an umbrella. With the panels collapsed for traveling, the entire unit is about 10 ft wide and 12 ft high. The panels are made up of I-beam and channel sections framing a steel grid faced with ⅝-in. plywood. Three coats of plastic paint protect the plywood.

After towing them to the job, a truck positions a pair of units side by side. A portable hydraulic system with three 3-in. cylinders powered by a small electric motor elevates the collapsible form panels of each unit.

Crews place telescopic pipe shoring, adjustable by means of a jack at the base, around the perimeter of the form panels to provide additional support. They also place jacks to hold the frame on which the panels are mounted so that the single axle, rubber-tired wheels can be removed as a unit for use on other trailers.

A two-man crew sets up forms for an umbrella in about 6 hr. Steelworkers place 4x4-in. welded wire mesh on the second day and then the concrete crew moves in to pour the umbrella. A six-man crew working with a Lorain crane places the 16 yd of concrete for an umbrella in about two hours. When completed, the total load supported by the form units is about 32 tons.

Concrete is allowed to set for three days. A two-man crew takes only about two hours to strip the forms and move them to a new location, usually on the fifth day after the pour.

The reusable form units were developed by Shell Forms, Inc., the subcontractor erecting them for Cawdry & Vemo, the prime contractor on the job. Shell Forms is a subsidiary of Proctor Products Co., Inc. of Edmonds, Wash.

Unusual Equipment Spread Moves

Pumps lower water table . . .

. . . and three tractors push-load the scrapers.

A roadbuilder uses pumps to lower the water table in a borrow pit so scrapers can remove sand for use as fill. And a dragline helps load the scraper bowls.

SEVENTEEN SCRAPERS are working two 10-hr shifts and hauling as much as 40,000 yd of sand a day for a four-lane highway in Michigan. The material is tough to load; two or three push-tractors are the rule. And because haul distances are as great as 4 mi, the contractor finds it economical to top-out the scraper loads with a dragline.

The 7-mi job is part of Michigan State Route 78 about 20 mi east of Lansing. It involves a total of 1,650,000 yd of excavation. Cuts along the road account for 450,000 yd of this. Another 150,000 yd is a surface layer of peat that has to be removed because it cannot be used as fill material. The remaining 1,050,000 yd is borrow.

And here's where the contractor, C. F. Replogle Co. of Circleville, Ohio, was having a few problems because the water table in the area is just a few feet below the ground surface. For unclassified fill material, the pits cover fairly large areas. But they are kept quite shallow in order to stay above ground water.

But for selected borrow a deeper pit is necessary because good fill material is concentrated in only a few spots. About 250,000 yd of this borrow is sand, needed for a subbase along the entire 7-mi stretch. All of this sand is taken from a single borrow pit that covers 38 acres. And to get enough material Replogle has to go down about 8 ft and fight water all the way. To get the sand out, the pit is dewatered during earthmoving operations. Later it will be improved and serve as a pond.

Big Machines

Replogle has assembled all of his biggest scrapers and tractors to move the dirt on this job. Ten of the rigs are combinations of big M-R-S tractors and several different makes of scrapers. Six are Caterpillar No. 90 scrapers with a heaped capacity of 27 yd each. Two are Wooldridge OS-260's that carry 32½-yd heaped loads, and one is a 41-yd Wooldridge OS-300. The biggest is a 50-yd M-R-S scraper.

Two Cat DW20's and five DW21's complete the self-propelled scraper fleet. In addition to these, there are four Cat tractor-drawn scrapers. These handle stripping, and work on short hauls in the road cuts only.

Five D9's work as pushers, and D8's pull the four drawn scrapers. Five more D8's level the fill and work along the right-of-way and on haul roads. One Michigan 280 wheel dozer works as a pusher part time and handles other jobs both in the borrow pits and along the fill.

Earthwork along the right-of-way is routine. First, three Lima draglines and the drawn scrapers come in and remove the surface layer of peat. This is dumped along either side of the road; later it will be used as top soil for the embankment. When this is completed, the scrapers come in and make the cuts along the road.

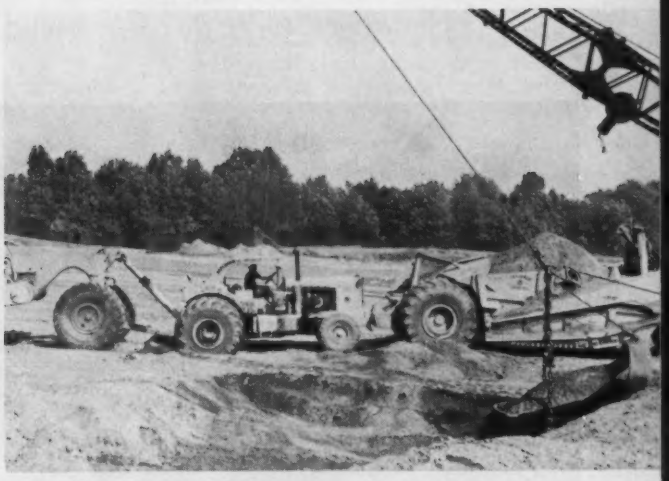
But operations in the 38-acre borrow pit that supplies the sand are a bit more complicated. The surface layer of peat is removed first, just as it is along the roadway. A 4½-yd bucket on a 1201 Lima dragline handles most of the preliminary work in the borrow pit. The unusable material is dumped along the edges of the pit to serve as a bank for the future pond.

Lowering the Water Table

Just below the peat is good fill material, but so is ground water. To dewater the borrow pit, a sys-

a Million Yards of Borrow

Then dragline completes the loading...



...and push sends scraper on its way...

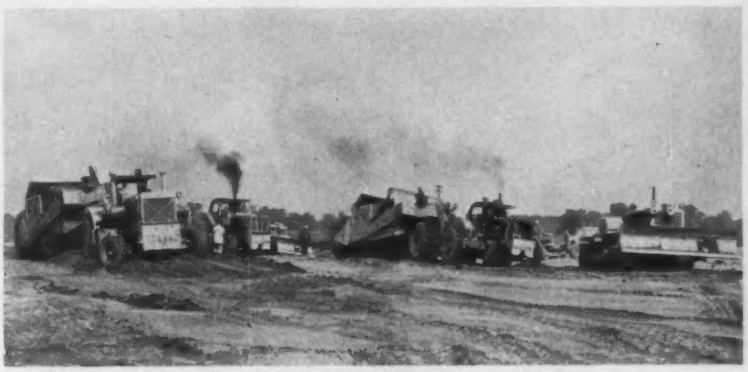
tem of ditches and pumps was put in operation. The dragline extends a network of ditches that lead to two sumps in the corners of the pit.

One of the sumps is dewatered by a 6-in. Jaeger pump, the other by one 6-in. and one 3-in. Jaeger pump. At first, all pumps operated 24-hr a day in order to lower the water table. Once this was accomplished, one of the 6-in. pumps was sufficient to bail out the water seeping into the ditches during earthmoving. The other pumps were left in place, though, for extra capacity in case of rain or as spares in case of breakdowns.

With the dewatering system in place, Replogle is able to remove about 6 to 8 ft of sand from the borrow pit. The only trouble they're having here is some difficulty in loading the sand into the big scrapers.

There are two problems: The scrapers can't get enough traction in the sand to move about easily when full; and the sand tends to roll or flow in front of the scraper when it's being push-loaded. This makes it impossible to get a full bowl, which is economically necessary for the long hauls.

Tandem pushing is a must to load the scrapers. Two Cat D9's generally are enough to push-load the Cat scrapers, but the big M-R-S and Wooldridge units are more of a strain. Two D9's can handle them, but to speed things up, a third pusher lends a hand. This is a Michigan 280 wheel dozer that usually gets behind the two D9's to boost the loading speed of the big scrapers. The 280 also handles grading along the haul roads.



...to the fill area about 2 mi distant.

Dragline Helps Load Scrapers

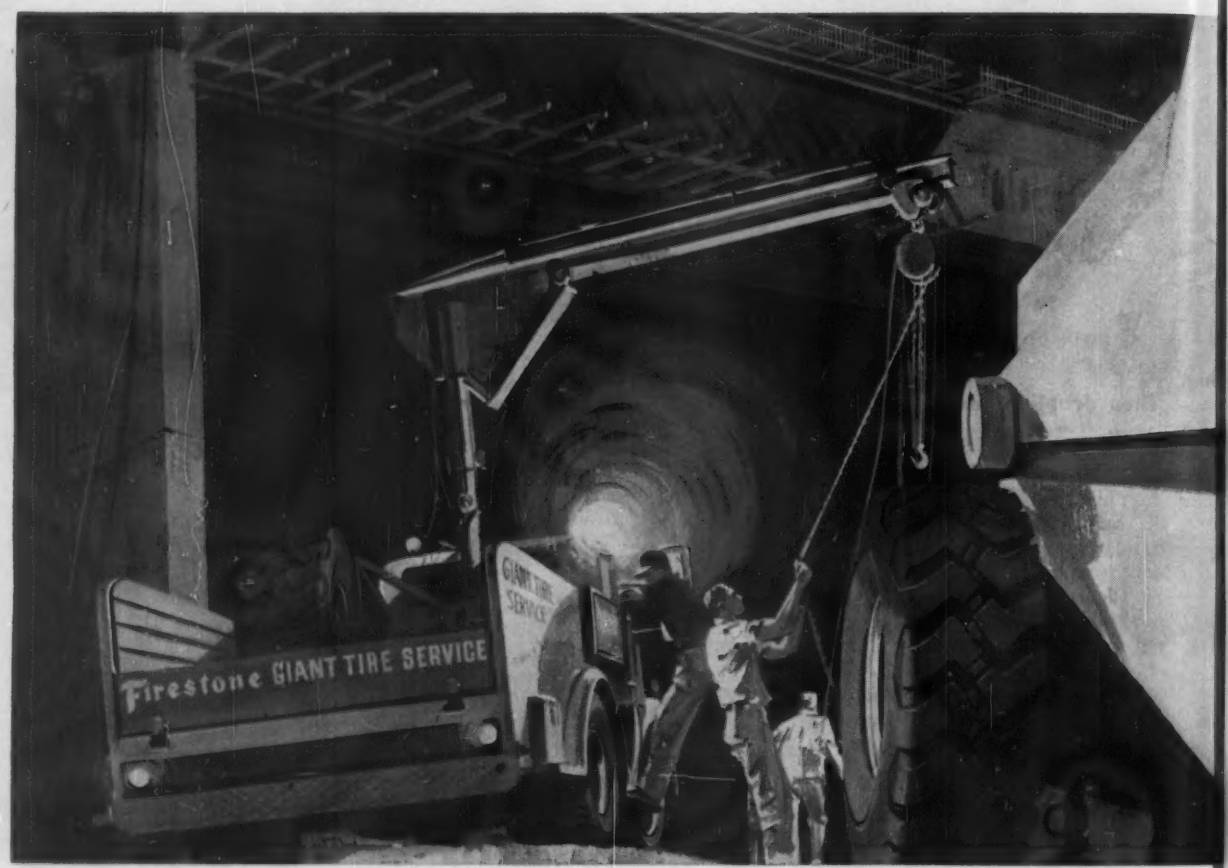
But push-loading is not enough to load the scrapers fully. When the bowls are about 2/3 full, the sand just flows in front of the scrapers without getting into the bowl. Here's the system Replogle uses to insure full scraper loads:

The 4½-yd Lima dragline again joins the earthmovers. It is stationed at one of the dewatering ditches nearest the haul road leading out of the borrow pit. As the dragline extends the ditch, it loads the excavated sand into the scrapers as they pass it on the way to the fill.

The scrapers stop just long enough to get two or more bucketfuls of sand to make a heaping load. Then they continue on to the fill. This loading system works fine except that it's hard to start the rigs once they're filled to the brim by the dragline. The units can't get enough traction in the sand, and it takes some pushing to get the rigs into motion again.

When an M-R-S scraper approaches the dragline, it can get

Firestone's Giant Tire Service keeps the wheels rolling



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You know how expensive tire downtime can be! The answer: keep it short. And with a Firestone Tire Expert on your project, it *will* be short. He'll do the worrying for you. He'll keep the correct pressure in the tires for every condition. Many times, he'll put the finger on trouble before it happens. But if trouble happens fast, he'll fix it fast. He can match new tires to any job, any rig—tires built with Firestone Rubber-X, the longest-lasting rubber ever used in Firestone tires plus the extra strength of Shock-Fortified nylon cord. So let Firestone take some of the risk out of those low bid jobs. Firestone Giant Tire Service is one of the best hedges against deadline pressure.

*Firestone T.M.

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BETTER RUBBER FROM START TO FINISH

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Circle 65 on Reader Service Card

MILLION YARD BORROW . . .
continued

the preceding scraper out of the way because the M-R-S tractors are equipped with pusher plates. But a separate tractor is needed when a Cat scraper follows an M-R-S rig or another Cat unit. So a D9 was stationed at the dragline to push out all of the scrapers.

This method of loading the scrapers is good to a depth of about 6 or 8 ft. If more material is needed, all of the loading may have to be done with the dragline because ground water would interfere and additional dewatering would be too costly.

Replogle started the earthmoving in early July, working only one shift at first. By the end of July they had moved about ¼ million yd when they went to two shifts. And during the month of August they handled ¾ million yd with a daily average of about 35,000 yd.

Project superintendent for Replogle is Bill King, and Vic Burdick is project manager. Dean Shellhous is general maintenance superintendent, and Wilbur Meek is preventive maintenance superintendent.

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MAIL EARLY IN THE DAY — IT'S THE BETTER WAY!

All Teeth Stay Sharper, Last Longer with

Stoody TUBE BORIUM!

ROAD RIPPER TEETH *averaged 7 to 10 times more life after receiving protection with Tube Borium. Notice how tooth chisels down with wear.*

Wear and loss of digging efficiency are common complaints on all types of teeth—*ditchers, power shovels, rippers, draglines, dredges, etc.* Hard-facing greatly prolongs useful life. But even so, each tooth can be made to last *far longer than ever before* and *retain its sharpness* by hard-facing with Stoody TUBE BORIUM!

Why is this one hard-facing alloy so superior on teeth? *No other hard metal equals TUBE BORIUM in straight abrasion resistance.* Its deposits are thickly peppered with tiny tungsten carbide particles. Wear is virtually defied by this hardest-of all man-made metals.

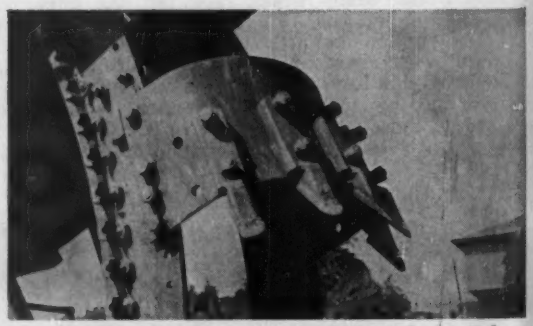
More expensive in first cost, Tube Borium shows excellent economy in overall service life, outlasting other materials many times over. And longevity is not your only benefit. Remember, one major cost of any hard-facing application is welding time. Use the best, Tube Borium, and you'll save several applications of less effective alloys besides eliminating needless downtime!

Your Stoody dealer (check the Yellow Pages of your phone book) will supply details, literature or recommendations. Ask about Tube Borium—or write direct.

SHOVEL TEETH *wore out in one 8-hour shift. A few beads of Tube Borium applied during noon break prolong life 6 or 8 full shifts. They are then repointed and hard-faced for further use.*

DRAG LINE TEETH *used in slag dump were hard-faced with Electric Tube Borium—outlasted unprotected teeth 9 to 12 times.*

TUBE BORIUM is available in stick form for oxy-acetylene or manual electric application. Also in continuous wires for automatic and semi-automatic electric application. Various mesh sizes for individual uses.



DITCHER TEETH—*A few ounces of 30-40 Electric Tube Borium on points of teeth increased life 6 to 8 times over factory originals.*

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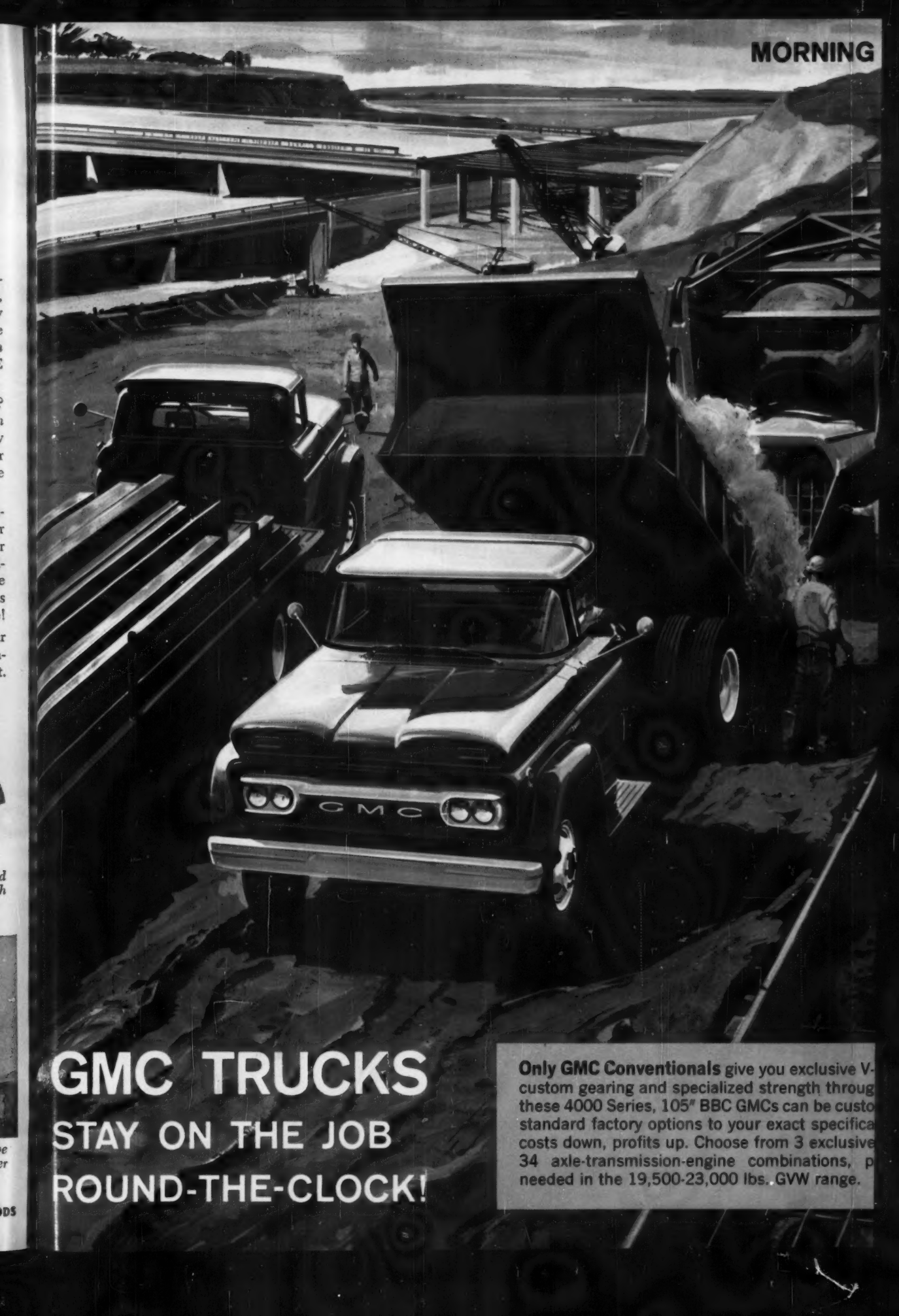
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Cut your job time! Profit from the superior performance of the exclusive 401 cubic-inch V-6 engine. Larger clutches. Bigger payloads with better weight distribution from 90" BBC. Extra-rugged cabs with double-wall construction... all the advanced features... uncompromising durability that have made this BW5500 Series the most popular GMC construction truck.

Highest performance o
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Haul 120,000 lbs. GCW anywhere (or 64,000 lbs. GVW) with the biggest diesel-powered GMC Truck ever built—the DBW9000 Series. It's as massive and rugged as it looks. Choice of 11,000 or 15,000-lb. front axle, 48,000 or 50,000-lb. tandem. Standard equipment—14″ solid dual disc-type clutch, 1106 sq. in. brake lining area, 5-speed overdrive and 4-speed auxiliary transmissions.

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nce of any standard gas-engine GMC LW7000 Series is powered by the with 625-630 pounds-feet torque at 75 hp. at just 2400 rpm. Easy-to-ve and easy-to-own 72" BBC tilt-cab construction hauling demands from 76,800 lbs. GCW.

Haul 120,000 lbs. GCW anywhere (or 64,000 lbs. GVW) with the biggest diesel-powered GMC Truck ever built—the DBW9000 Series. It's as massive and rugged as it looks. Choice of 11,000 or 15,000-lb. front axle, 48,000 or 50,000-lb. tandem. Standard equipment—14" solid dual disc-type clutch, 1106 sq. in. brake lining area, 5-speed overdrive and 4-speed auxiliary transmissions.

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THE TRUCK TRIUMPH OF THE 60's

Now producing more economical, more profitable trucking operations as a result of the greatest engine, chassis and cab engineering advances in 20 years!

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Smoother, maximum power from every drop of fuel starts with equal fuel-air mixture to each cylinder. This is accomplished with short, individual intake manifold inlets.

Engine life is greatly extended with temperature variation held within 4 degrees throughout the entire system. Up to 176 gallons of coolant circulating every minute does away with concentrated, damaging "hot spots."

Bigger, longer-lasting valves. Both intake and exhaust valves are extra large and durable with big valve heads; thick, short, stiff stems; integral valve guides; positive rotators on most models . . . everything for better sealing, less wear, free breathing and cooler operation.

Better oil control and longer life are the benefits of GMC-built aluminum pistons with cast-in steel expansion control band and chrome-plated top ring. Leaks and uneven wear are minimized.

You get increased engine durability with shorter, huskier crankshafts that resist deflection. Generous journal overlap and up to 60% more bearing area increase engine life, too.

Rock-solid strength and rigidity are the natural results of the short block with 3-inch drop skirt and staggered cylinders. Deflection is practically eliminated.

Less friction and wear. Full-pressure lubrication system with up to 14 gallons of oil circulated per minute by high-capacity, rotary pump adds to engine life.

FOR ALL THE PROFIT-FACTS, S

GMC cabs last and last on every construction job because they are built extra-strong and reinforced at all stress areas. See the double-wall design. Entire cab is phosphate coated to protect against damaging rust and corrosion.

Get shorter turns, longer life with new, stronger I-beam front axles, increased tread and wider spring centers. Surer stops and longer lining life with larger brakes.

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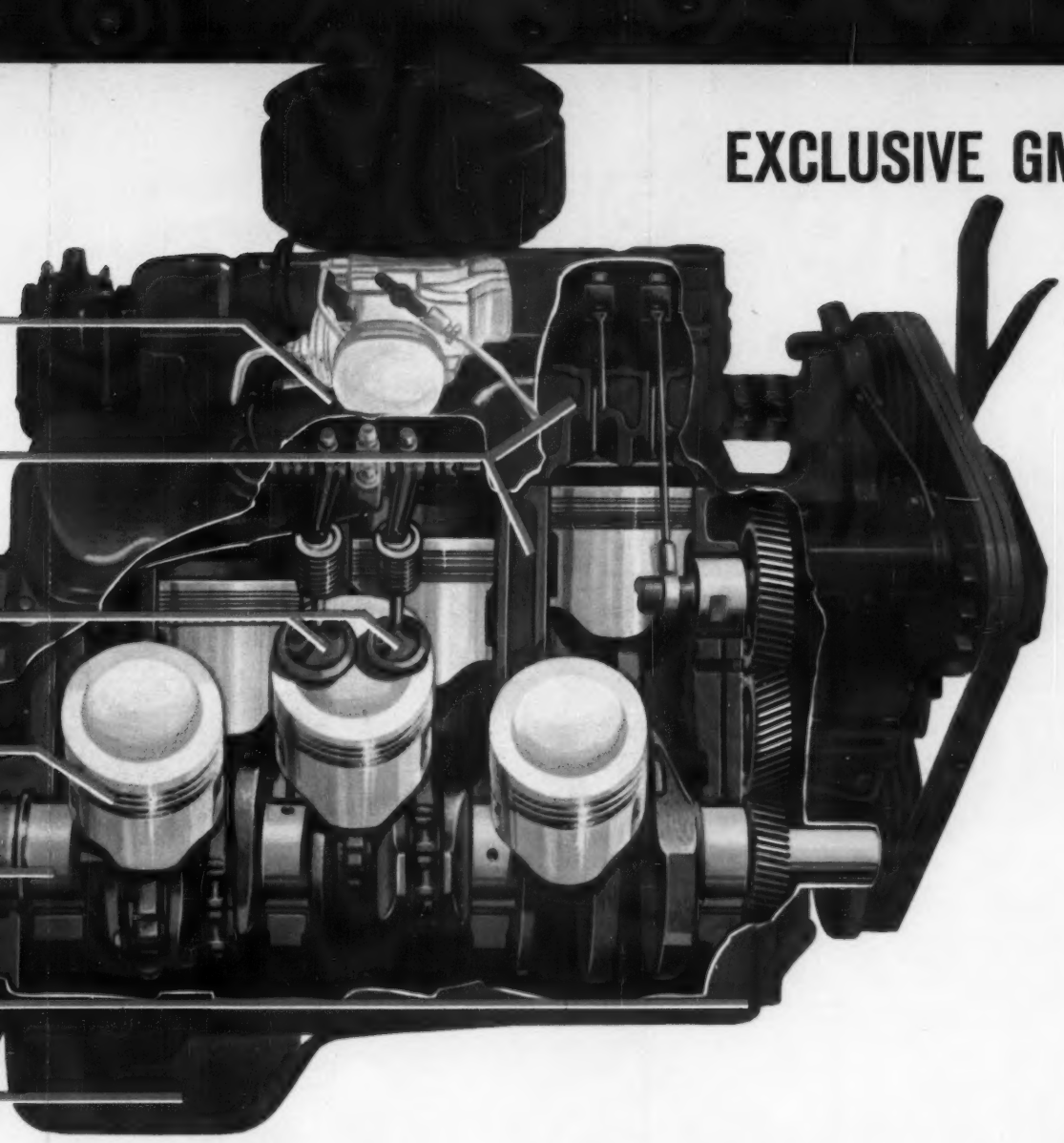
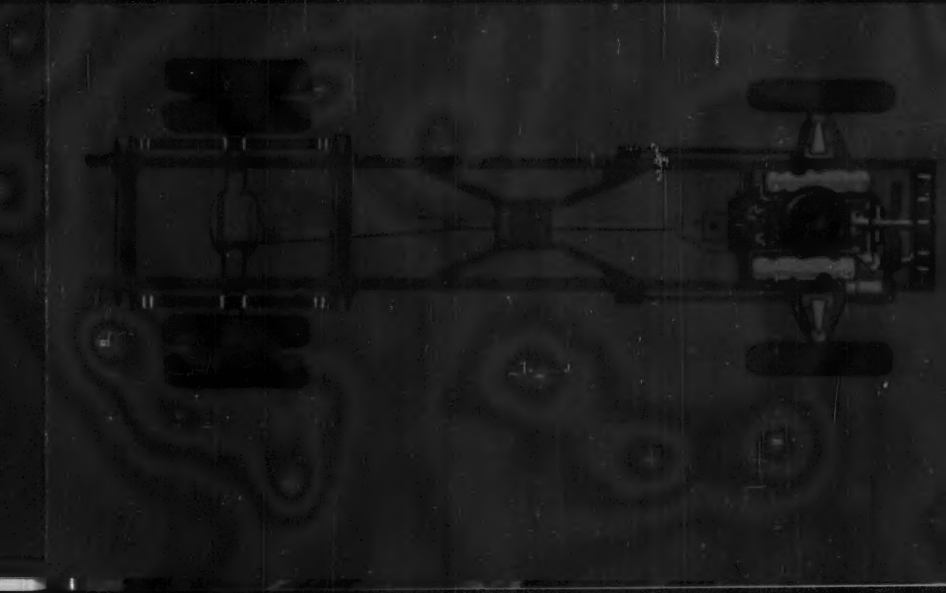
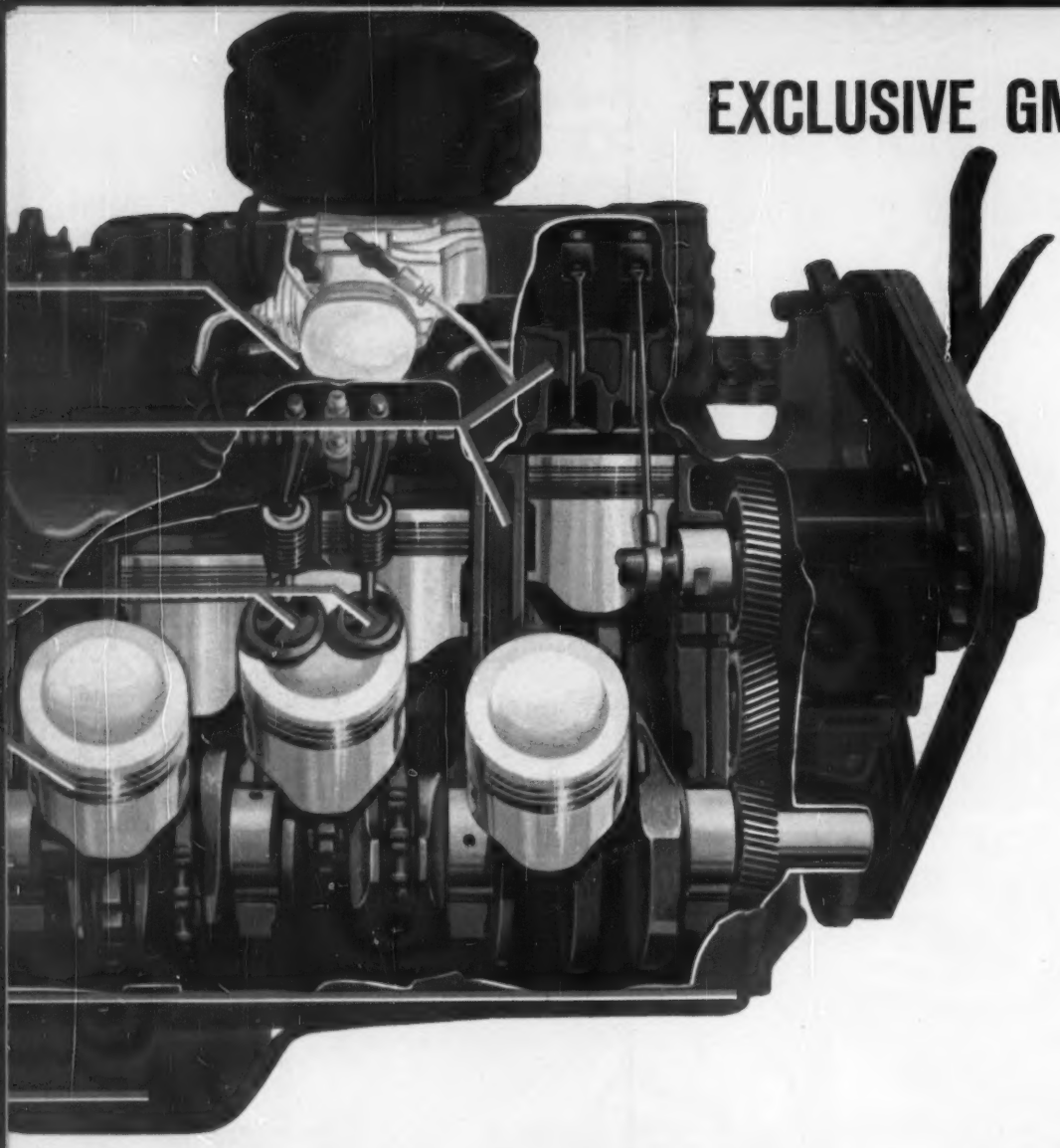


S, SEE YOUR GMC DEALER LISTED IN THE YELLOW PAGES O



From tough, full-load starts to no-load highway speeds you have the final drive ratios to meet your needs exactly. It's easy with GMC's wide selection of rear axle, main and auxiliary transmission combinations.



EXCLUSIVE GMC V-6

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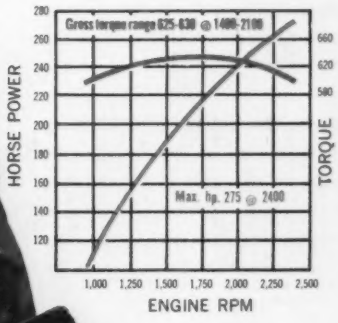
From tough, full-load starts to no-load highway speeds you have the final drive ratios to meet your needs exactly. It's easy with GMC's wide selection of rear axle, main and auxiliary transmission combinations.

AND TWIN-SIX GAS ENGINES ARE BUILT TO OUT-LAST, OUT-PERFORM ALL PREVIOUS GASOLINE ENGINES!

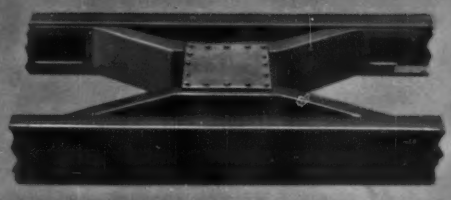
Here are the gas engines that are the talk of the trucking industry . . . with good reasons. Exclusive, extended-life GMC V-6s are built only for trucks, with full power output over a broad range at low engine speed to give you higher performance, stay on the job longer, cut fuel and maintenance costs.

This is the most powerful gas engine offered as standard equipment in trucks today . . . the exclusive Twin-Six by GMC. Look at the power curves below. Notice the high power at low rpm . . . the low-stress, easy-stroking engine speed that greatly extends engine life, saves fuel, reduces gear shifting up to 60%, permits you to maintain higher sustained road speeds on all terrain. Just one turn behind the wheel will prove the unsurpassed performance. See your GMC Dealer and give it a try today.

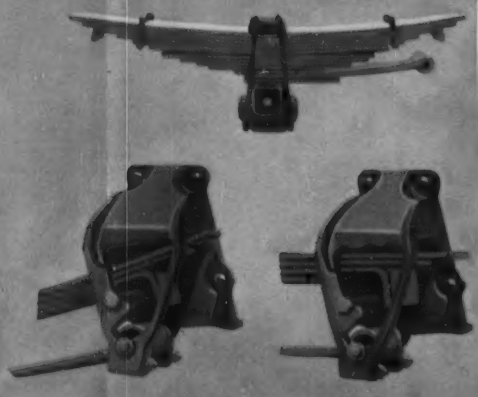
EXCLUSIVE V-6 POWER FOR BONUS EARNINGS ON EVERY HAUL		
Model	Gross Torque Range	Max. Horsepower
305A	258-260 @ 1400-2200	150 @ 3600
305B	264-266 @ 1100-2000	150 @ 3600
305C	268-270 @ 1200-2100	165 @ 3800
351	308-312 @ 1400-2400	180 @ 3400
401	375-377 @ 1200-2000	210 @ 3400



S OR ANY OWNERS OF NEW GMC CONSTRUCTION TRUCKS



Truck and cab life are increased with extra-rigid frames of completely new design and construction. Up to 35% stronger, too. They are built to carry the biggest loads under the most extreme applications.

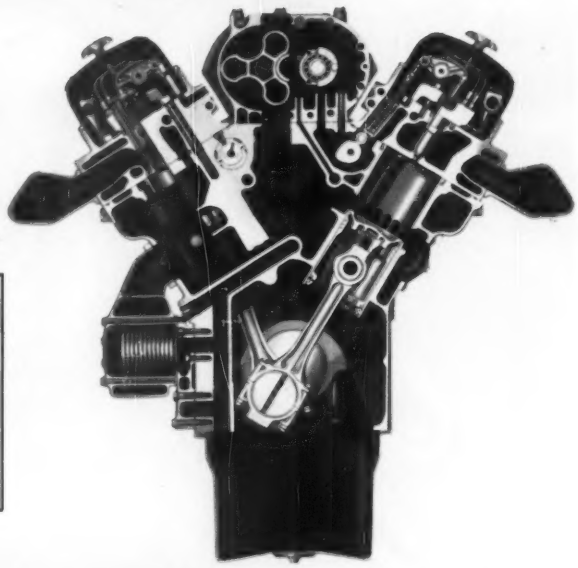


EMPTY LOADED

Bigger the load, stiffer the springs . . . as they should be. This is how new GMC vari-rate rear springs work . . . automatically. Full 3 inches wide, yet they are up to 100 pounds lighter than springs of previous design. Notice the bottom leaf transmits all braking and torque forces to the frame.

NEW V-6 DIESELS ARE SETTING NEW PERFORMANCE AND ECONOMY RECORDS FOR CONTRACTORS EVERYWHERE!

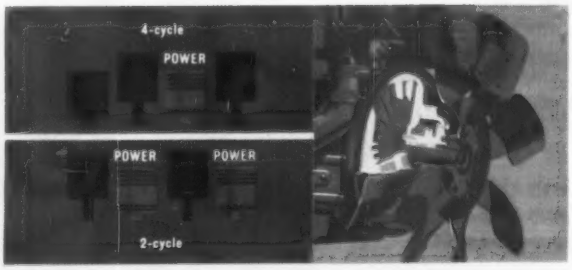
GMC Truck V-6 diesels are the proved, efficient 2-cycle power plants that produce load-moving power on every downstroke . . . smoother, faster acceleration. More power per dollar! More power per cubic-inch! More power per pound! Hundreds of pounds lighter and several inches shorter than comparable diesel engines.



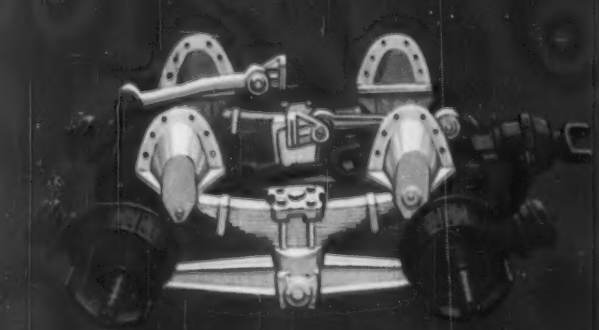
PERFORMANCE-MATCH YOUR DIESEL POWER NEED		
Model	Max. Torque	Max. Horsepower
6V-71	577 @ 1200	189 @ 1800 to 210 @ 2100
	604 @ 1200*	197 @ 1800* to 218 @ 2100*

*At sea level

Smoother, faster acceleration GMC's two-cycle design delivers power on every downstroke of every piston . . . twice as often as in a four-cycle engine. There are no wasted strokes, no power lags.



Save up to 5% on fuel, release up to 7% extra horsepower to the drive wheels automatically with this hydraulically-controlled fan. Standard equipment only on GMC diesel-powered trucks.



More payload, less service is possible with these GMC tandems due to simplified, lightweight design. Greater stability with lower center of gravity. Longer axle and tire life with 50% load on each axle at all times. Four-point mountings eliminate concentrated frame stresses.

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GENERAL MOTORS CORPORATION
TRUCKS

From ½-ton to 60-ton . . .
General Motors leads the way!

GMC Truck & Coach—a General Motors Division
Pontiac, Michigan

43 PRESTRESSED CONCRETE I-BEAMS for unique Budd Car Building

As each of the 20-ton prestressed beams was needed, it was moved to the site and erected by crane. Beams are 44″ deep and span 46′ 10″ between column centers.

. . . made with Lehigh Early Strength Cement

Now complete at Somerville, Mass., is the Boston and Maine Railroad's new Budd Car Servicing Building—built of concrete for fire safety, efficient operation, long life and low maintenance.

All 43 of the big I-beams used on the job were identical in size and shape, which contributed to the simplicity and economy of their manufacture. Forty-one of the beams were designed for a total uniform load of 1,680 psf, plus four concentrated monorail loads of 1,500 pounds each. The other two beams required additional prestressing strands to handle loads from a sand storage tower.

Lehigh Early Strength Cement was used by New England Concrete Pipe Corporation, manufacturer of the beams, to maintain a fast, economical casting cycle paralleling progress on the roof structure. The strength specified for application of prestress—4,000 psi—was reached in just 15 hours, one third the time required with normal portland cement.

This is another example of the advantages of Lehigh Early Strength Cement in modern concrete construction. Lehigh Portland Cement Company, Allentown, Pa.

LEHIGH CEMENTS

Budd Car Servicing Building
Somerville, Mass.

Owner:
Boston and Maine RR.

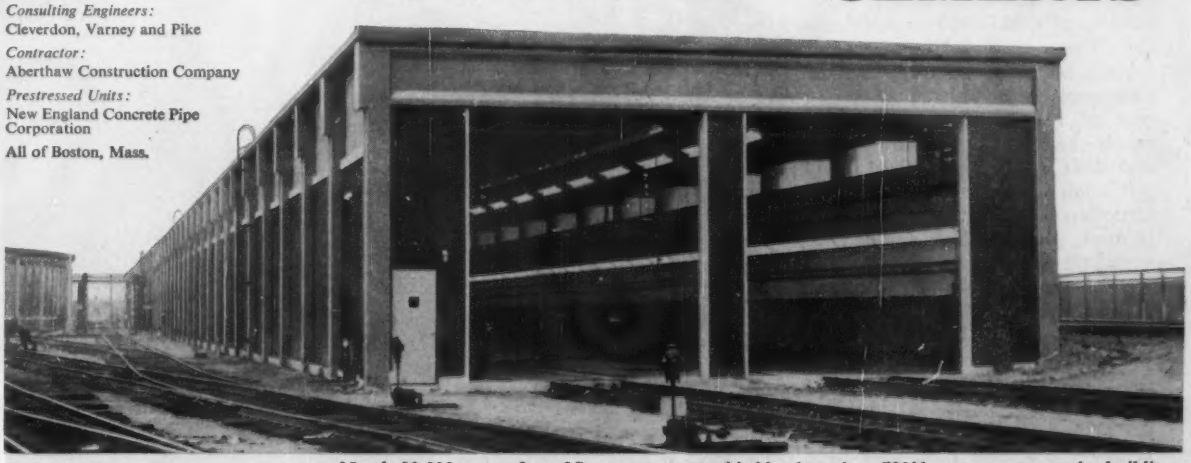
Architect:
Bastille Halsey Associates

Consulting Engineers:
Cleverdon, Varney and Pike

Contractor:
Aberthaw Construction Company

Prestressed Units:
New England Concrete Pipe Corporation

All of Boston, Mass.



Nearly 33,000 square feet of floor area are provided by the unique 720′ long one-story service building. It has 40 bays and a floor-to-roof clearance of 17′.

FORM JUMBO—A 32-ft long jumbo fitted with 1x8-ft Symons panels serves as a form for the inner surface of the circular sewer. Jumbo has hinged ribs, rides on plank rails.

shop-built forms. Above the spring line, they assembled standard-sized panels, one at a time.

The jumbo was permanently fitted with a series of 1x8-ft Symons Steel-Ply form panels running lengthwise. Circular ribs on 4-ft centers, made of four pieces of ⅝x6-in. plywood cut to proper curvature, carried the panels. And small V-shaped plywood strips between the form panels filled the space caused by the curvature. Each rib had two hinges, one on each side 4½ ft from top center, to allow the sides of the jumbo to swing in and out. Horizontal trench jacks held the hinged sides in place during concreting operations.

The ribs were supported by timber bracing, then seated on Beaver-Advance heavy-duty pipe scaffolding with screw jacks and casters under alternate legs. The legs with casters were shorter than the legs with jacks, making it possible to lower the jumbo onto the wheels and roll it ahead.

Assembling and stripping the forms was simplified by a new gang-form bolt and tie arrangement developed by Symons. The system allows ties to be inserted or broken without taking the panels apart.

continued on page 81

Gang Forms Simplify Sewer Job

JUMBO-MOUNTED gang forms that were easily stripped enabled a Cleveland contractor to pour ¼ mi of 13-ft-ID storm sewer in 3½ months.

To handle the job, National Engineering & Contracting Co., holders of a $375,000 contract for the Cleveland project, relied mainly on standard form panels. The contractor figured that the cost of renting the panels was much cheaper than building special steel or wooden forms. They put their savings into the construction of three 32-ft-long jumbos, the number needed to complete concreting before cold weather set in.

Each jumbo, which rode 4x10-in. plank rails laid on the previously poured invert, formed-up for the inner surface of the circular sewer. For the outside, National had two different systems. Below the spring line, they used

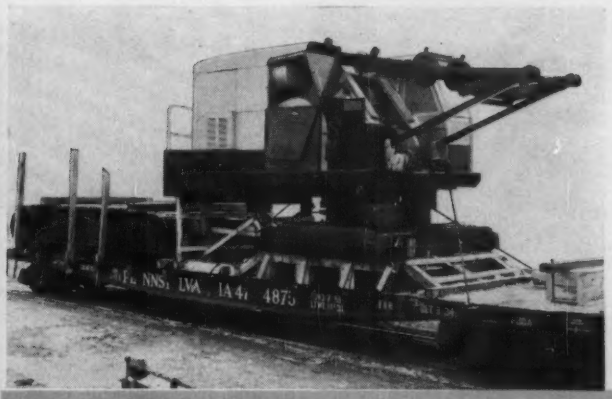
BIG PULL—With a block and tackle arrangement, workmen manually pull the stripped jumbo 30 ft ahead for the next pour. They strip, move, and position the jumbo in 1 hr.

New 80-ton crane features faster, simpler removal of side frames for easier shipping

The new Lorain 880 Crane has long, wide, heavy crawlers with an all-new way to remove side frames. Unique telescopic axles actually *slide out* of the frames . . . instead of frames being dragged off axles. The *complete* frames are then quickly lifted to car or truck.

A jaw clutch between the chain drive sprocket and the horizontal propelling shaft enables the side frame to be removed without "breaking" the tread belt or the drive chain. It all comes off in one piece—and goes back the same way.

Easy transportation. The superstructure rests on blocking on car or truck. For fast reassembly, the "880" easily swings the assembled side frames and treads into position so that the slide stub axles may be pulled into them.



Plus other output boosting features. Simultaneous boom derricking or lowering with hoist and/or swing. Square-Tubular-Chord Boom with open-throat boom head to eliminate block fouling. "Joy-Stick" air-power turntable controls. Air-power crawler controls. "Shear-Ball"® turntable connection is warranted for 10 years. Three tread widths: 34″, 44″, and 48″.

These outstanding features are also available on the 70-ton Model 870 crane, clamshell or dragline.

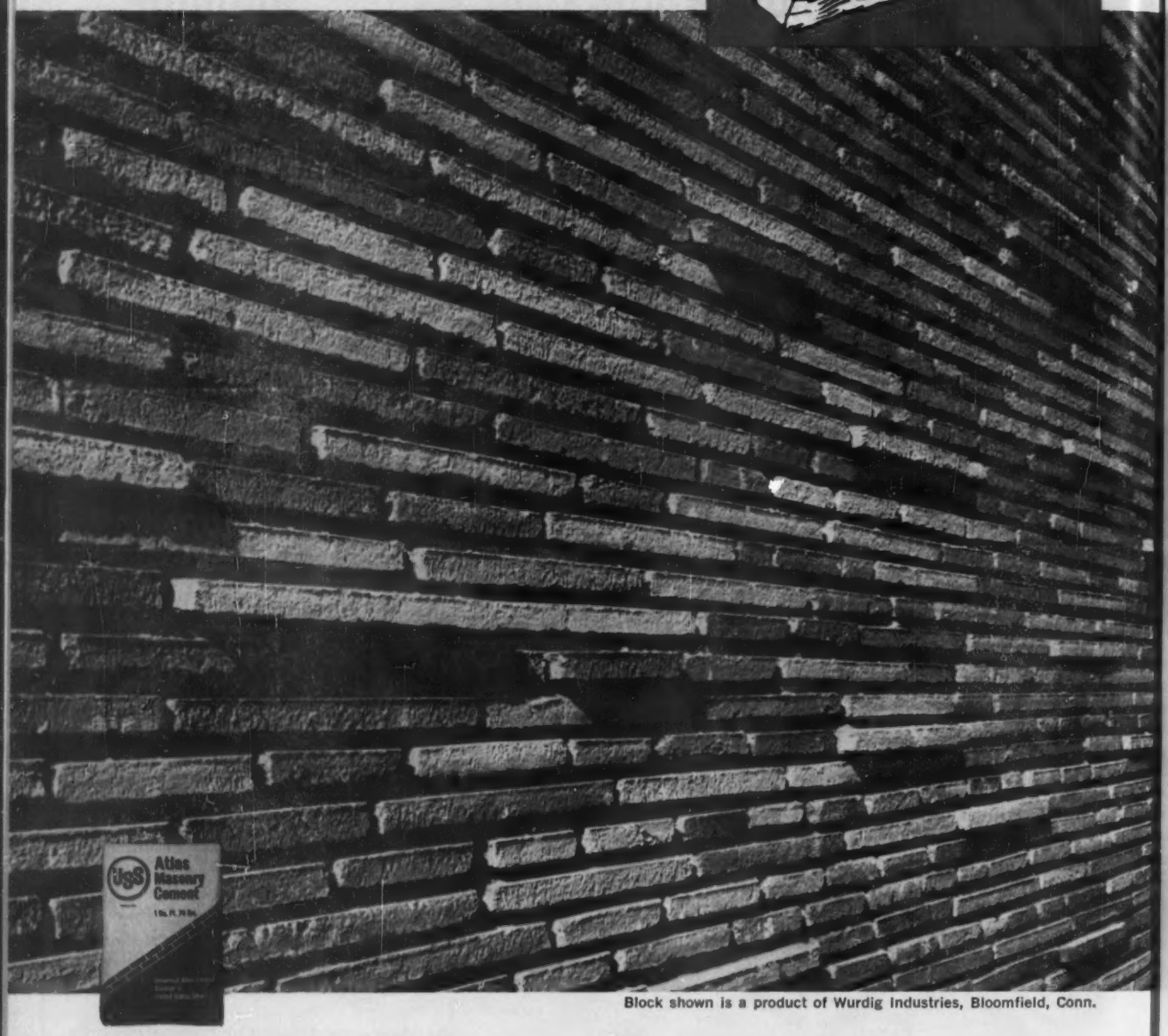
The Thew Shovel Company, Lorain, Ohio

LORAIN® ON THE MOVE

PLANTS: In Lorain, Elyria and Bucyrus, Ohio . . . **PRODUCTS:** Power shovels, draglines, clamshells, and hoes from ⅜- to 2½-yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6000-lb. and 7000-lb. carrying capacity . . . **OUTLETS:** Lorain products sold and serviced by 249 distributor outlets throughout the world.

Circle 79 on Reader Service Card

Great new things are shaping up in concrete block



Block shown is a product of Wurdig Industries, Bloomfield, Conn.

Atlas Masonry Cement provides the right mortar

This is "slump block." It is a decorative concrete masonry unit that resembles adobe brick or weathered stone. Usually integrally colored, "slump block" produces unusual effects in masonry construction. It is available from local concrete block producers in a variety of widths, lengths, colors and textures.

Whether "slump block" or other masonry units are used, ATLAS MASONRY CEMENT continues to be the preferred basic material in mortar. It makes a smooth, workable mix... gives a strong bond... provides durable joints that are uniform in color. Complies, too, with rigid ASTM and Federal Specifications. Literature on request. Universal Atlas, Dept. M, 100 Park Avenue, New York 17, N. Y.

Universal Atlas Cement
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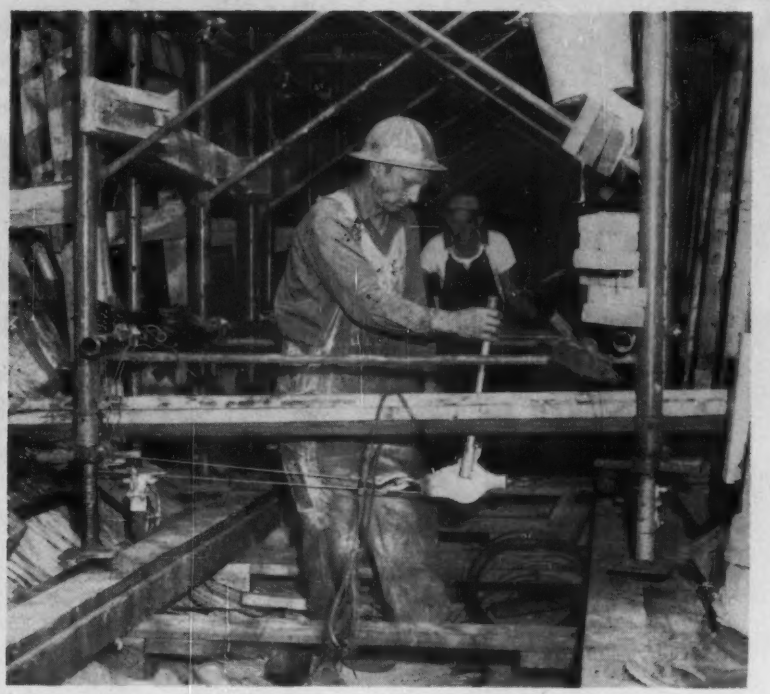


INSIDE VIEW—Hinged ribs swing inward as workman operates a come-along to strip form. The jumbo sits on pipe scaffolding with casters and screw jacks under alternate legs.

GANG FORMS . . . *continued*

One man handled these operations. He pushed a tie between adjoining form panels on the jumbo. A loop at the end of the tie remained accessible outside the form so that the tie could be broken later on.

Ties were broken on the day after a pour. Two days after a pour, the contractor stripped, moved, and positioned the jumbo, which represented 900 sq ft of form area, in about 1 hr. Here's how this operation worked:

Once the 15-in.-thick concrete wall had set enough to move the inside form, the horizontal trench jacks were removed. Then the sides of the jumbo were swung in with a come-along. The scaffold legs with screw jacks were lowered until the legs with casters rested on the plank rails laid along the invert. Then, with a block and tackle, workmen manually pulled the jumbo 30 ft ahead for the next pour. So far, only 40 min had elapsed. It took the remaining 20 min to jack up the forms and extend the sides with the trench jacks.

Once the jumbo was positioned, reinforcing steel was set. Then ties were inserted and locked in place. Outside forms were secured to these ties.

For the outside wall forms below the spring line, National prebuilt their own panels and secured them with double 2x6-in. walers. Ties that extended below the spring line had their ends shaped so they could be secured to these shop-built forms. Above the spring line, the contractor used Symons 14 and 16-in.-wide Steel-Ply panels. The loops on the ends of these ties were secured with conventional bolts and wedges.

As soon as the outside form panels were placed 3½ ft above the spring line, the pour began. To leave enough space for concrete placing and vibrating, forms were installed only to this height.

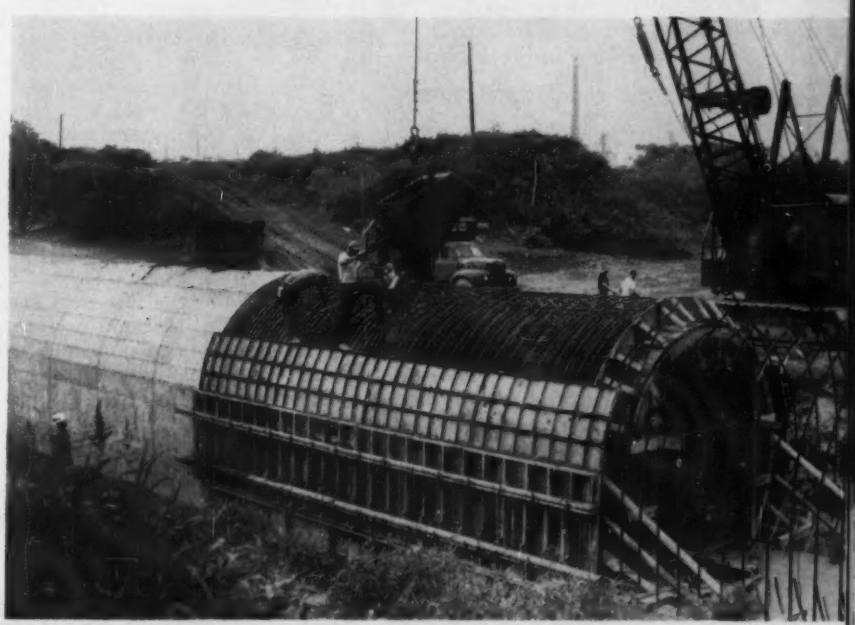
As the concrete rose in the form, three more rows of panels were placed. The top of the sewer was finished off by hand.

A crawler crane with a lay-down bucket handled the pouring. Total pouring time for a 30-ft section averaged about 3 hr. Sometimes the jumbo was stripped and re-positioned and a section poured all on the same day.

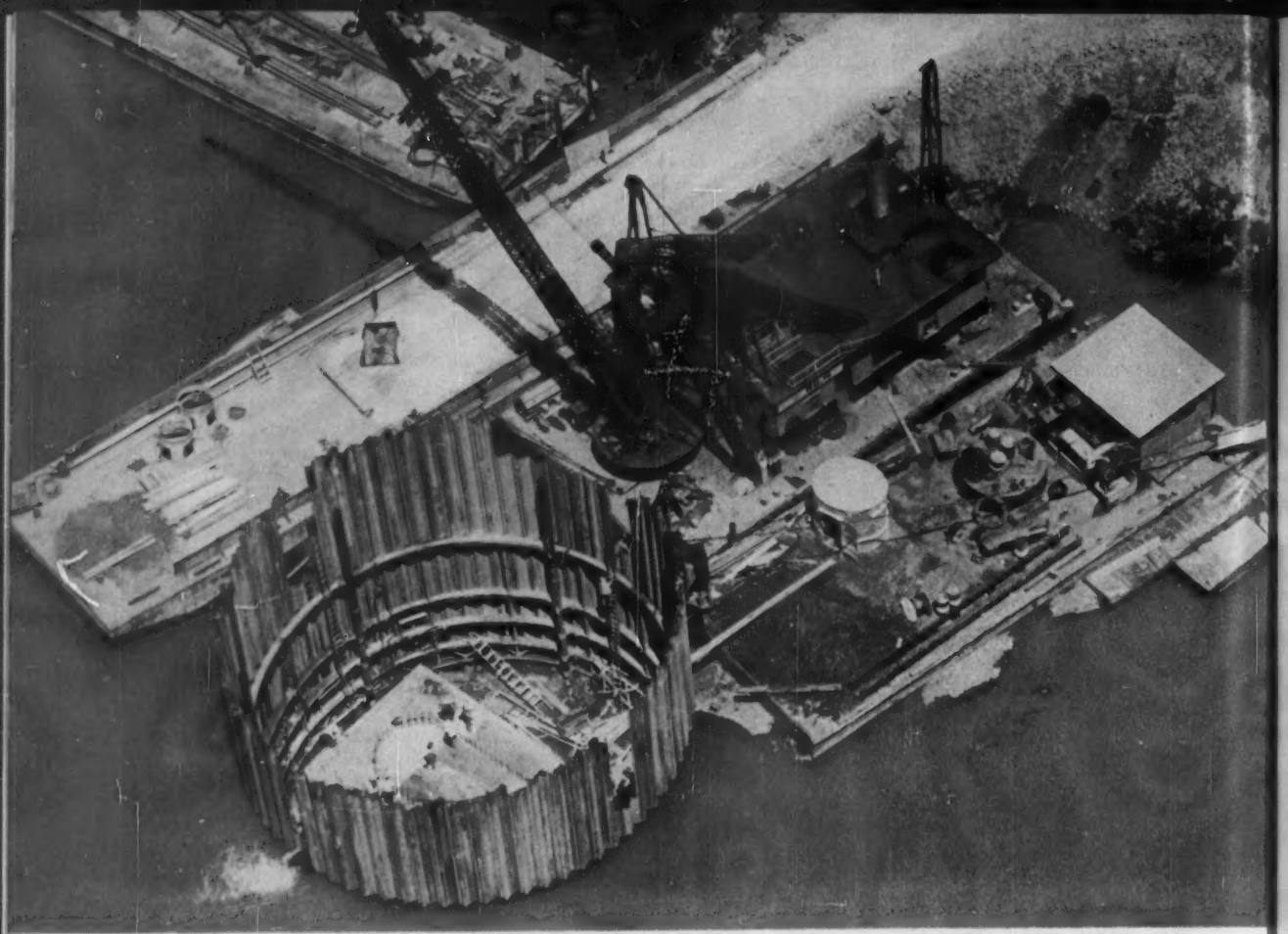
The contractor got two pours a week out of each jumbo. With three jumbos, 30 sections were poured in 50 days.

Construction conditions in the area were poor. Between 6 to 8 ft of swampy material had to be excavated, and waste slag from a nearby steel mill had to be brought in and compacted on the site. Eventually the storm sewer, which is located in a gulley, will be covered by 20 to 40 ft of fill.

For the contractor, Richard Turnbell was chief engineer and Carl Zwierlein, Jr., was project engineer.



CONCRETING—Crane with lay-down bucket handles pour as soon as outside panels are 3½ ft above the spring line. As concrete rises in the form, remaining panels are placed.



Large Open Cofferdam Speeds

Working inside a single, 50-ft-dia circular cofferdam, this bridge builder gets off to a fast start by building four piers in five months.

A NASHVILLE bridge builder has jumped almost a year ahead of schedule on the construction of a major bridge by the imaginative use of a little-tried device—a large, circular, portable cofferdam for building the river piers.

Marion Construction Co. has a $5.6-million contract with the State Highway Department to build the Wharf Ave. Bridge over the Cumberland River in Nashville. The bridge has two parallel but separate structures to carry two halves of a divided highway. The river crossing in each half consists of two continuous girder spans of 300 and 225 ft respectively. There are 36 approach spans of about 80 ft each on land.

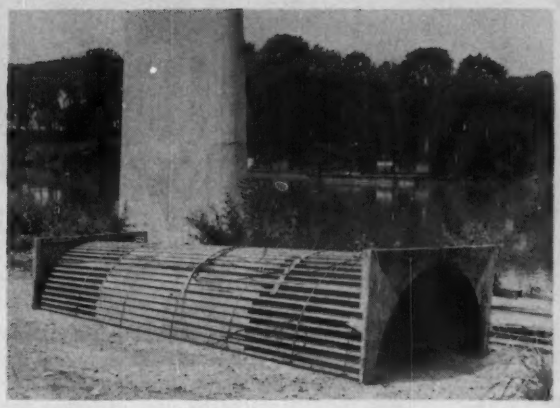
Marion started the job in May of this year and had the four major river piers completed in August. This put them so far ahead of schedule that, if all continues to go well, they will finish the bridge by January, 1962, a full year ahead of schedule.

The secret of the fast start was the cofferdam Marion used for the river piers. It was framed by a 50-ft-ID circular templet that could be lifted from one location to another by crane. This was one of the biggest, if not the biggest, circular templets ever built for a bridge job. At each pier site, Marion drove interlocking sheet piling around the templet to form a cofferdam.

The templet and cofferdam were completely free of struts and cross-bracing. This enormously increased the efficiency of operations inside it. An Allis-Chalmers HD-6G loader operated at full speed inside the cofferdam to feed excavated material to a Koehring 605 crane with clamshell bucket. The forming and concreting operations went just as fast.

Another big advantage of the circular cofferdam was the speed at which it could be moved. Marion built one pier at a time, moving the same cofferdam from one site to the next. It took only about 10 days to dismantle the cofferdam, move it to the next location, set it up, and dewater it.

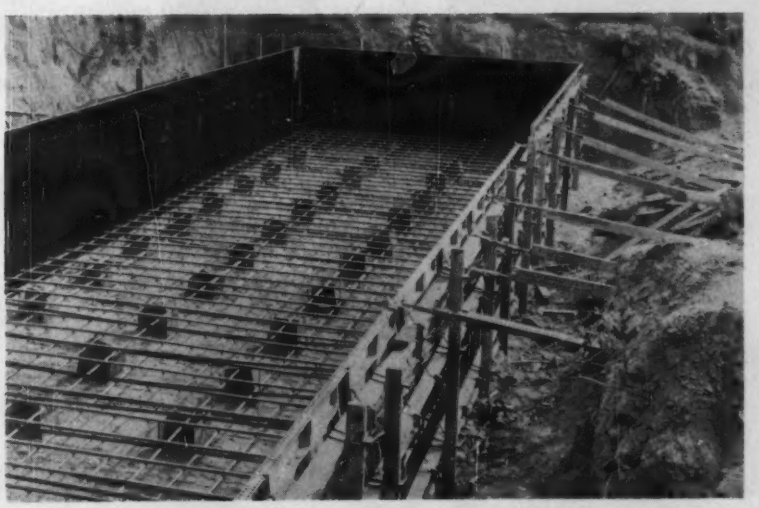
Marion scored such a complete success with the portable cofferdam on this job because conditions were just right. The river bottom, for instance, is bedrock overlain by about 4 ft of mud. This meant that the templet could be placed almost at grade elevation right at the start. It would have been difficult to add walers onto



PIER FORM—Forms for curved ends of piers are made of plywood backed by 2x4 stiffeners.

SIDE FORMS—Contractor formed the straight sides of the piers one-third at a time with ganged Economy form panels. The piers have a four-way batter.

CLEAR WORKING SPACE—Floating steam crane works full speed on concreting operations inside the cofferdam. Circular walers also act as templet for driving the piles



LAND FOUNDATIONS—Foundations for the two land piers are built in a shallow excavation. H-piles were driven about 40 ft to rock. Side forms are Economy panels.

Bridge Job

the bottom of the frame, so the system would not have been as effective if a deep excavation had been required.

Water depth was favorable; it averaged about 25 ft. The templet required for this depth weighed 40 tons, an easy lift for two heavy floating cranes. There is a limit to how deep the templet could be and still remain portable.

Fast Current

The current in the Cumberland River is relatively fast, but that didn't seem to cause any trouble. The Nashville Bridge Co., who designed the cofferdam, did not know the exact effect the current would have on the frame because they had never designed one this big before. But their calculations proved to be correct. There does not seem to be any inherent problem in designing a large circular cofferdam to withstand river currents.

Simple Frame

The templet consisted of five circular horizontal, WF walers, spaced at varying intervals according to the depth, and framed with vertical WF spacers. Evenly distributed around the circumference were six 12-in. pipe spuds, held in sleeves attached to the walers.

A pair of floating steam cranes placed the templet in position on the river bottom. The spuds were driven into the rock to hold the frame firmly in place. Then, MP-117 sheet piling supplied by the U. S. Steel Corp. was driven around the perimeter. The piling went into the rock as much as 3 ft in places. A diver laid three tiers of sandbags around the base of the cofferdam to complete the seal. It took 12-24 hr to dewater the cofferdam with two Gorman-Rupp pumps. Thereafter, a single 8-in. Fairbanks Morse electric sump pump had little trouble keeping the cofferdam dry.

The frame was built by the Nashville Bridge Co. in their Nashville shops and floated, fully assembled, to the bridge site by barge. The Crain Co. of Pittsburgh had a subcontract for the cofferdam work in the field.

continued on page 86

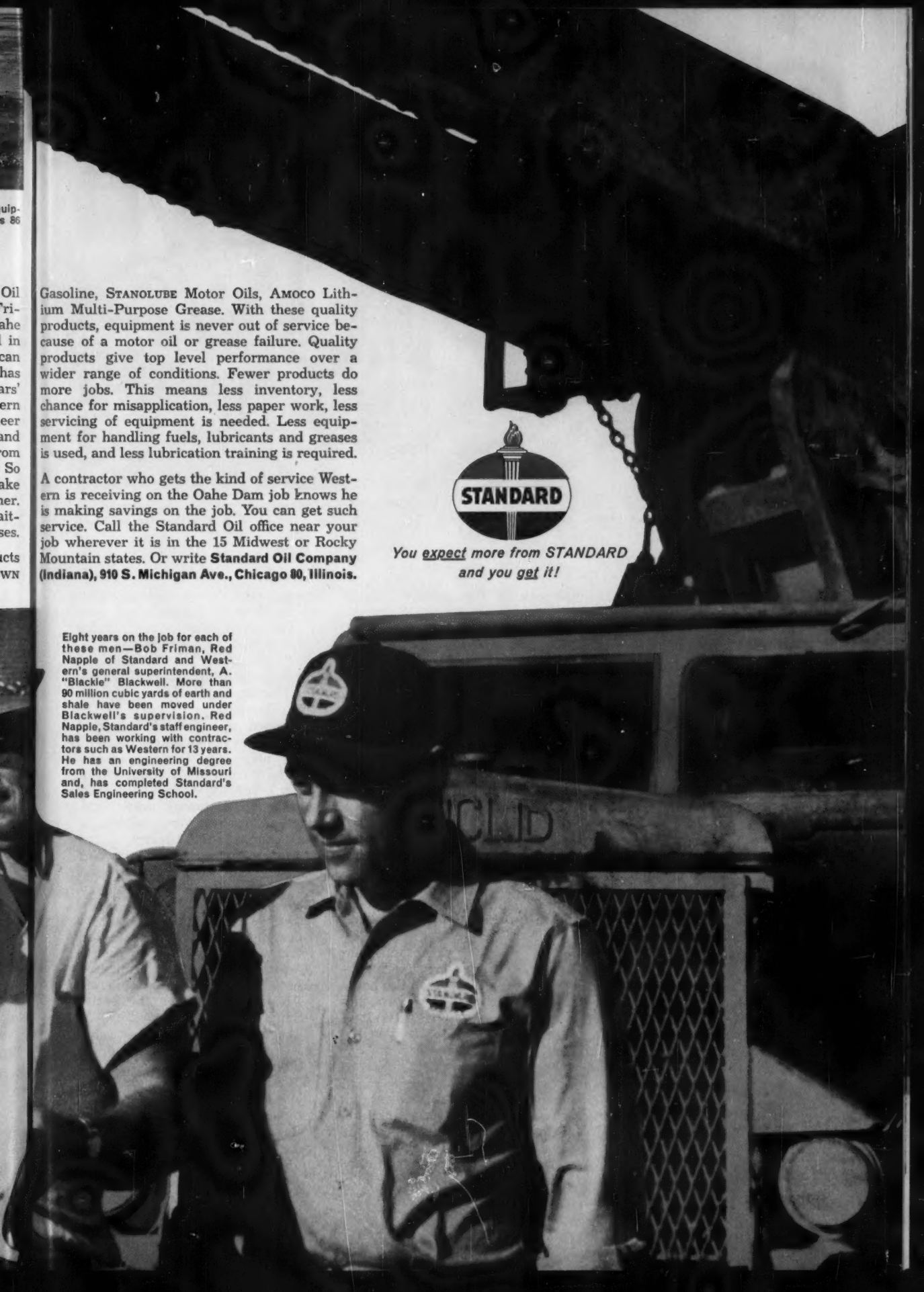
Multi-million dollar picture. Here is part of Western's equipment lined up for inspection at Oahe Dam. Photo shows 86 trucks, 23 bulldozers and crawler pieces and 9 scrapers.

2 ways Standard Oil helps Western Contracting Corporation save on Oahe Dam job

In eight years on project, 10 million gallons of diesel fuel and gasoline have been delivered on time and when needed

Saving No. 1 F. L. "Red" Napple, Standard Oil staff engineer, and Standard Oil agent Bob Friman have been serving Western on the Oahe Dam project since the first dirt was moved in 1952. This means continuity of service that can be invaluable to a contractor. Red Napple has an engineering degree plus more than 13 years' experience in just this kind of work. Western thus has the equivalent of another engineer helping them. Napple is located at Aberdeen and Friman at Pierre, both only a few miles from the job. Western works around the clock. So does Standard. Bob Friman and his men make deliveries 24 hours a day, winter and summer. Western never has equipment down while waiting for deliveries of fuels, lubricants or greases.

Saving No. 2 Western uses only quality products —Standard's Diesel Fuel, STANDARD RED CROWN



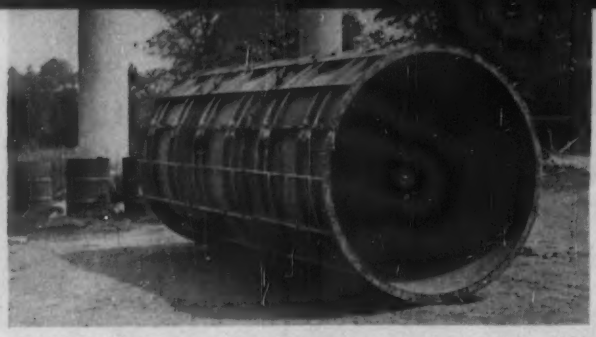
Gasoline, STANOLUBE Motor Oils, AMOCO Lithium Multi-Purpose Grease. With these quality products, equipment is never out of service because of a motor oil or grease failure. Quality products give top level performance over a wider range of conditions. Fewer products do more jobs. This means less inventory, less chance for misapplication, less paper work, less servicing of equipment is needed. Less equipment for handling fuels, lubricants and greases is used, and less lubrication training is required.

A contractor who gets the kind of service Western is receiving on the Oahe Dam job knows he is making savings on the job. You can get such service. Call the Standard Oil office near your job wherever it is in the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**

STANDARD

You expect more from STANDARD and you get it!

Eight years on the job for each of these men—Bob Friman, Red Napple of Standard and Western's general superintendent, A. "Blackie" Blackwell. More than 90 million cubic yards of earth and shale have been moved under Blackwell's supervision. Red Napple, Standard's staff engineer, has been working with contractors such as Western for 13 years. He has an engineering degree from the University of Missouri and, has completed Standard's Sales Engineering School.



COLUMN FORMS—Steel forms for columns are bolted together in field.

BEAM FORMS—Friction sleeves and I-beams carry horizontal forms.

CONCRETING—Koehring 205 crane handles concrete for piers. Tilted beams provide superelevation for roadway.

COFFERDAM SPEEDS BRIDGE . . . *continued from page 83*

Main Piers

It takes six piers to carry the river spans. Four of them are in the river and were built inside the cofferdam. The other two are on the north bank and were built easily in shallow open excavations.

The footings for the river piers are rectangular concrete slabs, 25 ft wide, 48 ft long, and 8 ft thick. Marion formed them with Economy 24x48-in. panels backed by 2x4-in. timber studs and walers. A Koehring 605 crane with a 2-yd bucket transferred the concrete from ready-mix trucks to the foundations.

The water piers are 86 ft high, with flat sides and curved ends. They have a ½-in.-per-ft batter on all four sides. Width varies from 13 ft at the bottom to 6 ft at the top.

Marion formed the straight sides with Economy panel forms. For the curved end sections they built special wood forms of curved plywood backed by 2x4-in. stiffeners. Each curved form assembly was 1/3 the height of the pier.

The foundations for the land piers are 17x60 ft. Each is set on 60 H-beam piles. The piles are 12H73 sections and average 40 ft in length. H. C. Jordan Co., of Ozark, Ala., subcontracted the pile driving. They used a Delmag diesel hammer on a 22B-Bucyrus-Erie truck crane.

Land Bents

The bents for the shorter approach spans are simple in shape, and Marion took full advantage of this by designing simple forms that could be reused repeatedly. Each bent consists of two 60-in.-dia vertical columns spanned by a rectangular cap beam.

Marion formed the columns with custom-made Economy steel forms. These forms came in quarter-circular sections that were bolted together on the job. The highest column is 60 ft. Marion poured both columns in a bent to the full height in one pouring operation.

The forms for the cross beam could be adjusted for superelevation of the roadway. On the north side of the river, the approaches curve, and as much as 3½-ft of superelevation is required in the 57-ft width of the roadway.

Marion fabricated special sleeves to hold the beam forms on the columns. One sleeve went on each column. It was made of ½-in. steel plate, 2 ft deep, and fabricated in two semi-circular pieces. The two pieces were bolted together in the field but were designed so that when they were drawn tight, there would be a gap of about 1 in. between the two halves. This was to insure the tightest possible grip on the column because the entire formwork for the beam was supported by the friction of the sleeves against the columns.

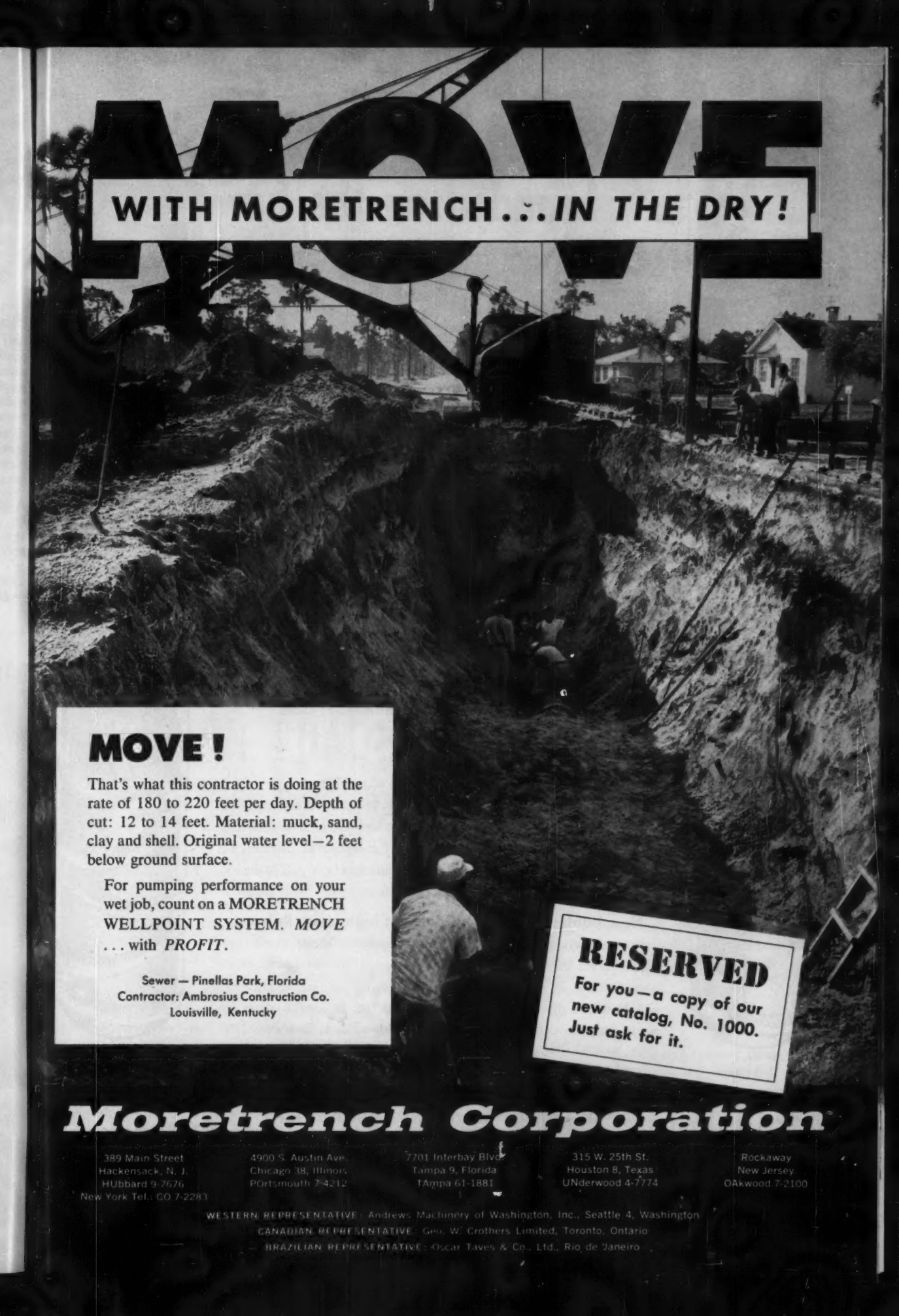
Welded to each side of each sleeve were two brackets made of steel plate. On these brackets, spanning from one column to the other, were laid two I-beams. Across the I-beams were laid 2x12-in. timber joists, which in turn supported the forms.

The soffit form was plywood sheeting laid on the cross pieces. The side forms were Economy steel panels.

On each side of the river, a Koehring 205 crane handled forms and concrete. Each used a ½-yd bucket for the concrete. About 25,000 cu yd of concrete will be required for the entire bridge.

About 100,000 cu yd of earth fill will be required to raise the grade at the north approach. Marion plans to get most of it by arranging to grade several properties in the neighborhood in return for the excess fill.

S. H. Bracey is superintendent for Marion. R. R. Higgs is resident engineer for the Highway Department.



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◀ *Circle 87 on Reader Service Card*

How many "machines" is a MODERN LOADER?

JOB-PROVE the 4-in-1 and see . . .

Here's what the 5 Four-in-One's, shown, are doing: (1) (Left foreground) The 3-cu. yd. TD-20 rig is 'dozing; (2) (Right foreground) The ¾-cu. yd. T-340 outfit as "carry-type scraper;" (3) (Right center) The 1⅛-yd. TD-6 4-in-1 "semi-skids" load on its skid shoes; (4) (Center): This 2¼-cu. yd. TD-15 "biting bucket" clam-handles a stump; (5) (Rear) TD-9 rig is back-dragging gravel!

It's a whole equipment spread of job-getting actions, if it's "the bucket with the bite"—an exclusive clam-action International Drott 4-in-1.

"Dragonized" to dramatize "the bucket with the bite," the five 4-in-1 sizes above demonstrate *plus* actions you get with the exclusive clamshell.

Full-capacity, full-range, depth-controlled bull-dozer performance. "Carry-type scraper" action to grade, strip, or spread with inch-close accuracy. Skid-Shovel action to "semi-skid" full buckets of material. Controlled back-dragging clam-action, to grade, pick up, or pull down materials. "Clamming-on" action to grab and load heavy unwieldy "impossibles."

Note also the 4-in-1 gives you the top excavator-loader performance on the market! That includes certified break-out forces ranging from 11,200 lbs. with the T-340, to 43,150 lbs. with the TD-20. And only the 4-in-1 gives you clam-type bottom dumping—that ends sticky materials loading problems, for good!

See for yourself how many "machines" the only *modern* loader is! Move the 4-in-1 machine-action selector lever. Prove you get a whole spread of money-making actions, that obsolete "single-action" loaders, and double for a yard-full of limited-duty rigs! See your International Drott Distributor for a 4-in-1 demonstration.

International Harvester Company, Chicago 1, Illinois
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How Payscraper® "automotive" operating ease highballs your dirt-on-fill delivery

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Push-button, finger-tip ease! Your operator simply pushes a button to direct-start the DT-817 Diesel and ready 375 high-torque hp to give a cycle-speeding Payscraper rim-pull of 60,000 lbs.; plus time-saving, "no-lag" control power!

Your operator pulls directly out of 90° turns—with 34-cu. yd. heap loads on either the 2-axle "295" or 3-axle "495." Ample power and traction team with the exclusive International tandem-pump, rack-and-pinion steering to give positive, right-angle turning with full power. This finger-tip controlled system leaves the "steering feel in the steering wheel," even at the top 33.5 mph speed.

For fast, positive dumping, the high Payscraper apron lift gives you a "barn-door-like" opening up to 94 inches! The positive-acting Payscraper ejector mechanism is powered by the International shock-absorbing, planet-type Cable Control Unit. One cable drum of this simple, fast acting unit actuates apron and ejector; the other drum positions the bowl to control spreading action. Shown, the 3-axle "495" fast-dumping on the fill!

He power-shifts the Payscraper, up or down almost like easing his car into automatic drive. The 4-speed, planetary-type, torque-converter transmission gives him load-speeding *automatic* direct-drive lock-ups in second, third and fourth gears!

Your operator power-steers the 150,000-lb. loaded Payscraper with automotive-like ease. He commands the exclusive "mind-reading" International rack-and-pinion, tandem-pump steering system—plus 3-degree forward spindle pitch that improves scraper balance and prevents "bucking bronco" nose-downs in high-speed turns!

He controls 34 cu. yd. loads on hills, fills, turns—anywhere—with positive-acting Payscraper air brakes. He power-controls all Payscraper dirt-handling actions, finger-tip easy, with the International PTO-driven constant running cable control unit!

And he rides in a foam-cushioned, 15-adjustment, bucket seat that gives positive, selective ride-control to match luxury car comfort.

See for yourself what it means, in highballing your dirt-on-fill delivery, to arm your operators with Payscraper advantages. Prove what happens when you give them the highest power-to-payload punch of the 34-cu. yd. rigs—along with Payscraper operating ease and safety. Choose the 2-axle "295," or 3-axle "495" and let your International Construction Equipment Distributor demonstrate!

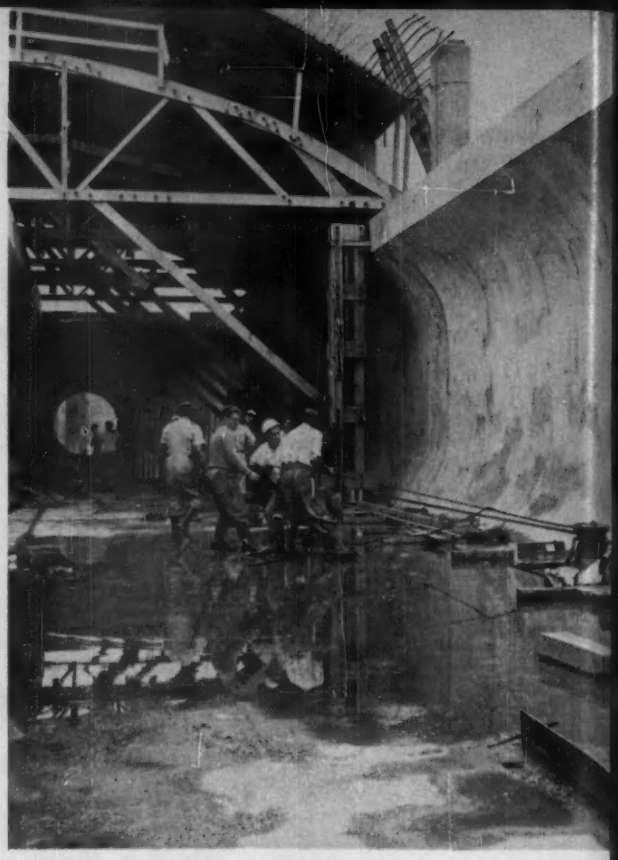
Up or down power-shifting—effortless power-steering—fast power control of Payscraper dirt-handling—all help your operator give you fast "kick-outs" and get full pusher hp efficiency. The highest power-to-payload punch of all 34-cu. yd. scrapers helps highball dirt delivery. The planet-powered TD-25 and TD-24 are "pushing" for this fleet of "295's"—building superhighway!

Here's the big torque converter transmission—that helps Payscraper models turn 375 turbocharged hp into industry top-ping production! Besides providing smooth shifting and speeds for every need, this torque converter gives automatic lockup for direct, load-speeding mechanical drive in 2nd, 3rd, and 4th gears!

International® Construction Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Ill.
A COMPLETE POWER PACKAGE

To build four barrel arches, a contractor uses four sets of movable forms. The falsework is equipped with winches for raising and lowering the forms, and it moves horizontally on wooden rails.



PORTABLE FORMWORK—Telescoping columns equipped with hand winch as raise and lower trussed arch forms for a barrel arch roof. The entir forming system rests on wooden rails that permit horizontal movement of th forms without disassembly. Chain hoists pull the formwork from pour to pou

Elevating Barrel Arch Forms Move on Wooden Rails

RAISING THE ROOF is the order of the day on a sewage treatment plant construction job. And appropriately enough, the location is New York's Coney Island.

New York City is expanding its sewage treating facilities here. The project includes grit and sedimentation tanks, buildings, pumping facilities, and eight aeration tanks. The roof raising takes place every time work crews position forms for successive pours for the concrete barrel arch roof over the aeration tanks. The tanks are 400 ft long and 28 ft wide. One barrel arch spans two adjacent tanks.

Formwork for this part of the project was specially designed, fabricated, and erected by Cartwright & Morrison, Inc., timber fabricators of Holcomb, N. Y. The forms are movable and will be used nine times. Average pour is about 45 ft long and covers all four arches.

Main features of the forms are the simplicity and speed with which they can be stripped, moved, and repositioned for successive pours. Exclusive of preparations, it takes about ½ hr for each handling operation for one form section, 57 ft long and 56 ft across. The span of the falsework arches is about 2 ft less. Components of the forming system include load bearing structural members, winches, and skids. The structural members are trussed arches that are covered with plywood and supported on extendable columns, or jacks. Hand winches are attached to the columns for raising and lowering the trusses. And the skids hold the jacks in place so the entire assembly can be slid along rails on the aeration tank floor.

Cartwright & Morrison fabricated the falsework in their shops and assembled and erected it in the field with their own forces. They stayed there just long enough to see one pouring and moving cycle. Then they packed up and went home, and the forms became the property of Lasker-Goldman Corp. of New York City, general contractor on the treatment plant expansion project.

Four Barrel Arches

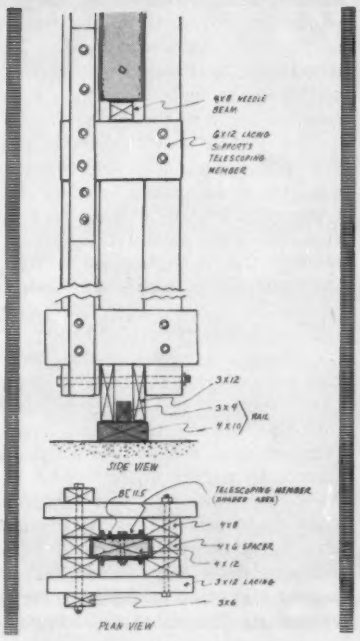
There are eight 400-ft-long aeration tanks, but only four arches. Each arch covers two adjacent tanks. They are approximately 28 ft wide and have curved sides; the walls are 17 ft high. Concrete columns, 10 ft high, sit on top of the walls between the tanks. The columns support a 4-in.-thick roof whose arch has a rise of 8½ ft.

This 8½-ft dimension also is a

key factor in the design of the falsework. There is a horizontal steel tie between each pair of concrete support columns at the base of the arches. When the arch concrete is cured, the tie is tensioned and becomes a permanent part of the structure.

To permit horizontal movement of the formwork without disassembly the trusses have to be dropped low enough to clear the tie. With this in mind, Cartwright & Morrison designed the jacking columns so they would telescope 9½ ft. The stationary part of the column is made up of timbers; the movable part is a composite timber and steel member. See sketch.

Each column weighs about 1,500 lb. And five of them are framed together to support one side of a form section. The five-column assemblies move from pour to pour along a wooden rail.



Erection Procedure

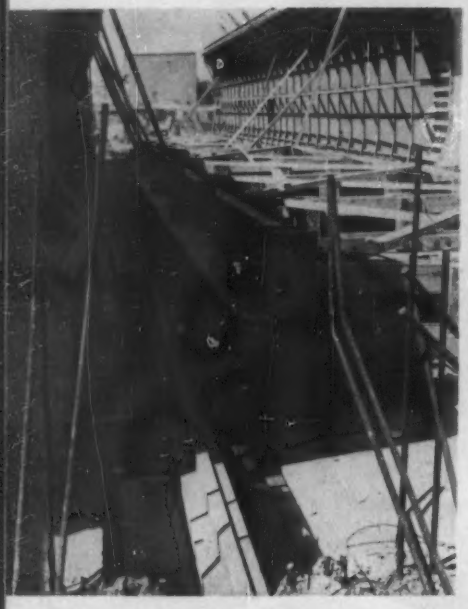
Two crews of carpenters assembled the various formwork components. One crew was assembling the trusses while a smaller crew erected the jacking columns.

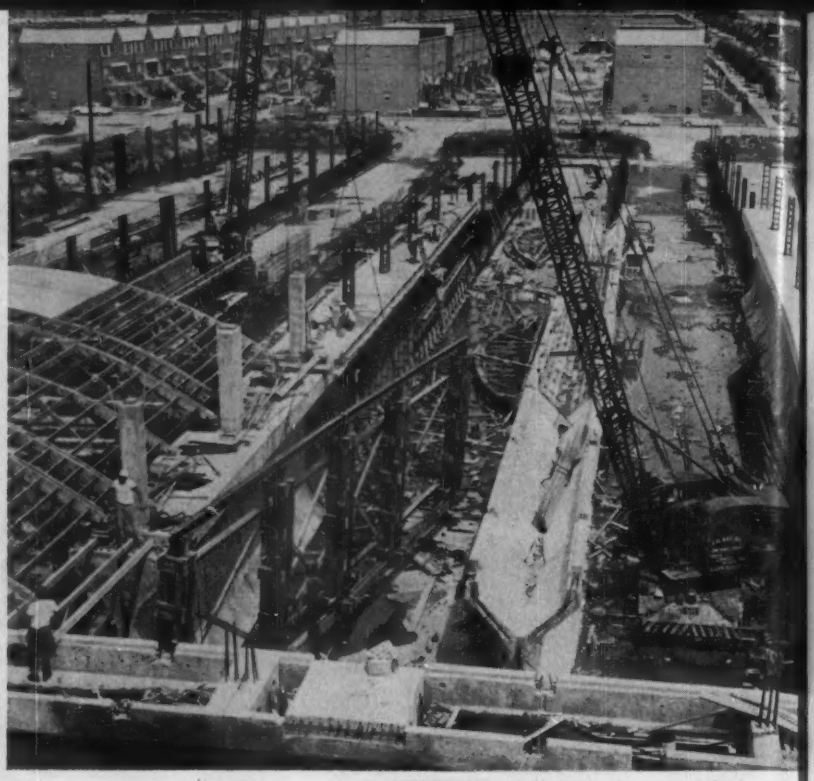
The columns were brought to the job site completely assembled, except for the hand winches. To erect them, Cartwright & Morrison's men first laid them on the floor of the aeration tanks. Then they cross-braced them so that the five columns of one form section could be handled as a single frame. At this time also, the skids were attached to the base of the columns.

Running along the top of all five columns is a continuous 8WF28 beam. It is bolted to steel plates that are welded to the tops of the movable vertical channels.

continued on next page

Crane Handles Five Columns As Single Unit





ERECTION—Link-Belt truck crane working from adjacent aeration tank lifts a five-column assembly into position on top of the wooden rails on the floor of the tank.

←
ON THE GROUND—Five jacking columns for one side of a form section are framed into a single unit. Two 3x12 skids are attached before the assembly is lifted into place.

Once all these components are assembled on the ground, a Link-Belt truck crane comes in and lifts the assembly into position on top of the wooden rail. The crane's hooks are attached to the 8WF28 beam. To keep the telescoping part from sliding out of the wood support structure, the crews tied the beam to the bases of the columns with wire rope.

When the column assembly reached a nearly vertical position, two men tied each end of the support beam to the top of the aeration tank wall. They used come-alongs to swing the top of the column assembly into a plumb position.

The seven trusses for a form section were erected next. The truck crane picked up the assembled trusses, less knee-braces, and placed them to be bolted on top of the wide-flange beam.

Roof Forms

As soon as the trusses were in place, carpenters went to work adding knee-braces, 2x10 joists, and bridging. Then the whole structure was covered with ⅝-in. plywood, completing the erection of the formwork.

Spacing of the seven trusses along a 57-ft form section varies. One truss is at each end of the section directly above the end pair of jacking columns. Another truss is halfway between them. The remaining four trusses are paired; each pair is located at about the quarter point of the section.

The two trusses in each pair are on either side of concrete support columns. Distance between the trusses is only about 4 ft here. This is done to accommodate the tie that spans between the concrete columns at the base of the barrel arches.

Form sections between the pairs of trusses are detachable from the rest of the falsework structure. After the concrete is cured and the ties are tensioned, crews remove the 4-ft-wide drop-out panels to permit lowering of the form assembly without interference from any of the permanent structural components.

Positioning the forms at their proper elevation takes three steps: extending the columns, adding a needle beam to support the telescoping center, and making fine elevation adjustments with jacks.

Raising the Roof

Hand winches extend the columns and raise the forms into position. One 5-ton Sasgen winch is attached to each of the ten columns, and it takes ten men working simultaneously to raise one form section.

It's important to extend all jacks at the same rate to keep the structure from warping. And the carpenter foreman, Bill Hull, came up with a handy gimmick for this purpose. He took thin strips of wood, graduated them in inches, and attached them to each of the jacking columns. As the formwork moves either up or down, the men at the winches can keep an eye on the yardstick and tell at a glance whenever the structure gets out of kilter. During raising and lowering, one man coordinates the operation by calling out successively higher or lower elevations. If a jack gets stuck or gets behind the elevation being called out, the winch

VERTICAL ALIGNMENT—Workmen with come-alongs pull the columns into a plumb position while crane supports the assembly.

TRUSS ERECTION—Truck crane places arched formwork trusses on steel beam that runs along the top of the column assembly. The jacking columns are in the closed position.

operator sounds off, and all winches are stopped until the situation is corrected. When all goes well, a form section can be raised in ½ hr.

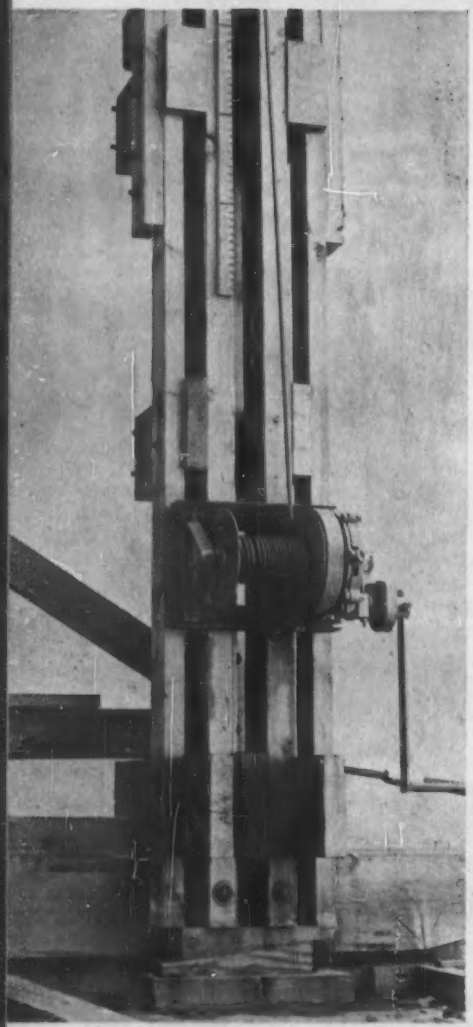
A needle beam is added when the columns are fully extended. The needle is an 8x8 inserted in the column just below the telescoping center. The 8x8 spans between horizontal 6x12 lacing members on either side of the column. Once the needle is in place, the hand winches are backed off, and all the weight is carried by the 8x8's.

The 6x12's were added to the assembly at a carefully measured height. This cuts down on the amount of fine adjustment necessary to get the forms in their exact elevation.

Final elevation adjustments require a little additional jacking. A screw or a hydraulic jack is placed under the lowest 3x12 lacing member of each column, and the jack is adjusted until the form is at its exact elevation. At this point, two wooden wedges are inserted under the column. Driven snug, they support the entire

SEVEN TRUSSES—Each 57-ft-long form section contains seven arched trusses. Their span is 54 ft and covers two aeration tanks. Span between concrete columns is 56 ft.

COMPLETING THE FORMS—Carpenters install 5/8-in. plywood on top of trusses and 2x10 joists. Joists in foreground are part of drop-out panel directly over the arch tie.



ELEVATION ADJUSTMENTS—Calibrated strip of wood above winch helps maintain uniform vertical movement. Final elevation is set with wedges below each column.

BARREL ARCH FORMS . . .
continued

weight of the column when the jack is removed. In this manner the rail along the floor actually carries very little or no weight while the falsework is in place.

Now the forms are ready for steel and concrete. Crews put down 3/8-in. rebars on 1-ft centers in both directions for the shell. They add extra steel for stiffener arches that run on top of the shell between pairs of support columns and for the longitudinal beam running along the valley. Finally, a 4-in. layer of 4,500-psi concrete completes a pour.

Stripping gets underway seven days later. First the steel ties between concrete columns are tensioned. Then work crews remove the drop-out panels above the ties. Lowering the forms is directly the reverse of raising them.

Jacks hold the columns so the two wedges can be removed and then lower the columns onto the rail. Again, ten men handle the winches; first they raise the forms so the 8 x 8 needles can be removed and then they lower the falsework all the way down. The horizontal move is next.

Chain Hoists Pull Forms

Each set of five columns is rigged with wire rope so the entire assembly can be skidded along the rails. To distribute the pulling force along the five-column assembly, the wire rope is looped around the middle column. It in turn transmits some of the pulling force to the first and second columns in the assembly through a timber compression member added between these columns.

Work horse in the pulling operation is a hand operated chain hoist for each side of a form section. The hoist is anchored to the floor of the aeration tank. A three-man crew handles each of the hoists. The horizontal move takes about a half hour. Bill Hull's yardstick again comes in handy here to gage the moves. Grease is applied to the rails to make the sliding easier.

Four Sets of Forms

Each pour is made over all four of the barrel arches. This is necessary to distribute the weight of the roof uniformly over all of the columns. And there are four sets of forms to do the job.

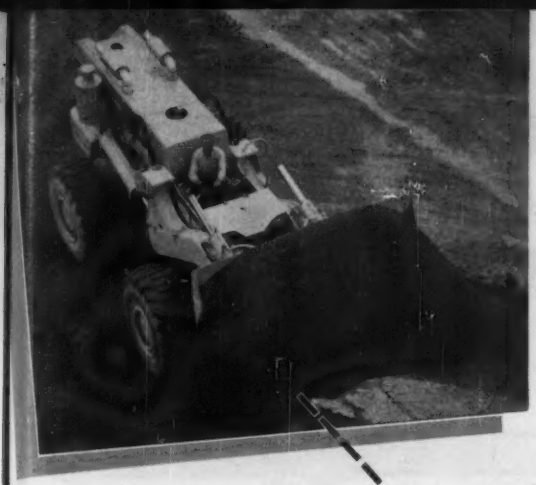
Average length of pour is about 45 ft. But the first and last pours are shorter to take care of odd dimensions near the ends of the arches.

Who's Who on the Job

The entire project at the treatment plant is under the direction of New York City's Public Works Commissioner Frederick H. Zurmuhlen. Joseph Soreff is project engineer, and Nathan Miller is resident engineer.

Lasker-Goldman's general superintendent is Michael J. Pinto; Walter F. Nolan is general superintendent in the field. Job superintendent is Theodore Cohen, and concrete superintendent is Bill Hyres. General carpenter foreman is Pete Ippoliti, and Bill Hull is foreman in charge of arch formwork. In the field office, Fred Amitrano handles on-the-spot form detailing.

Directing operations of Cartwright & Morrison was Stewart Shenk of C & M's Holcomb office.



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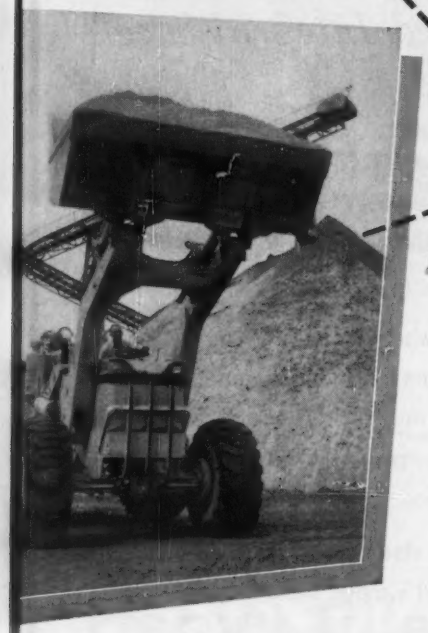

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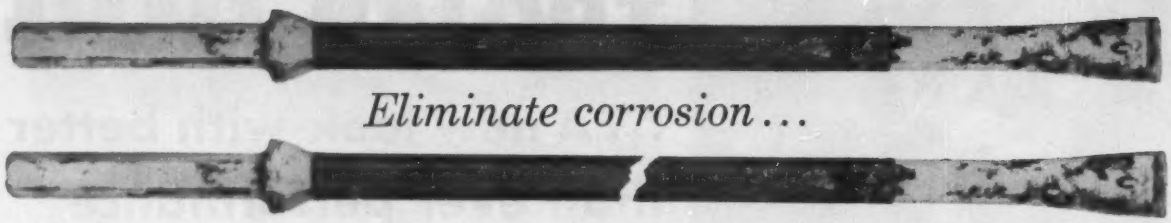

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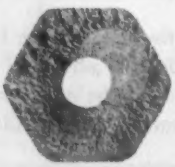

Appearance of a fatigue breakage that often arises with rods that have not been protected against corrosion. Sandvik's SR-treatment* protects against such failures.

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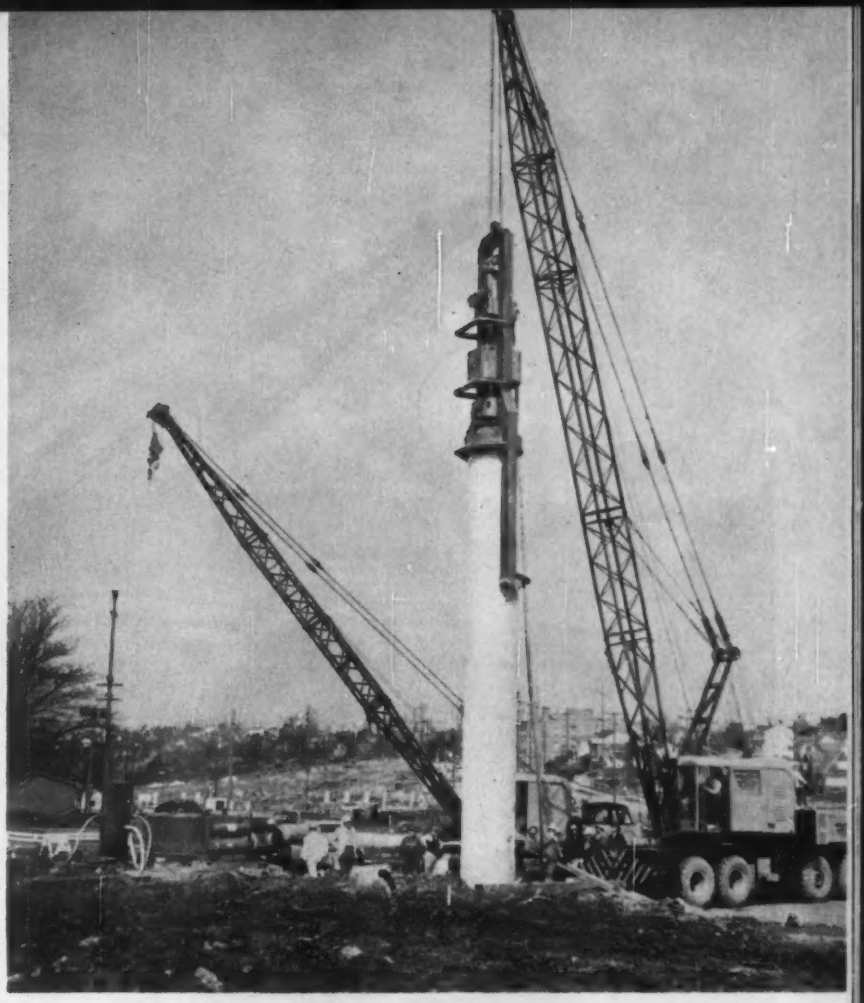
PRE-BORING — Truck-mounted CalWeld auger bores a 36-in.-dia hole to within 5 ft of pile bearing level. Wings on bit then enlarge hole to 54 in. to carry pile.



DRIVING—Vulcan O-14 single-acting air hammer with 42,000-ft-lb ram is mounted on Lorain truck crane. Special bell-shaped driving frame and head protect top of pile.

Heavy Piles Test Pile Formula

BACKFILLING — After the crane has placed the pile in the hole, and before driving begins, an Oliver C-46 front-end loader fills in hole around the pile with earth.

DRIVING large, prestressed concrete piles still is unusual enough that, almost every time it is done, there is something new to be learned from the job.

For instance, on the Ravenna Blvd. overpass construction for the new Seattle Freeway, the contractor, MacCrae Bros. Construction Co., prebored holes for 4-ft-dia piles. They drove the piles the final 5 ft to bearing. Then they test-loaded three piles and found that the actual capacity was close to their estimate of the capacity based on the Engineering News formula.

The piles were hollow with a 5-in. shell. They ranged up to 60 ft in length and up to 24 tons in weight. Each pile had ten tendons, composed of four strands of 7/16-in. wire prestressed to 38 tons.

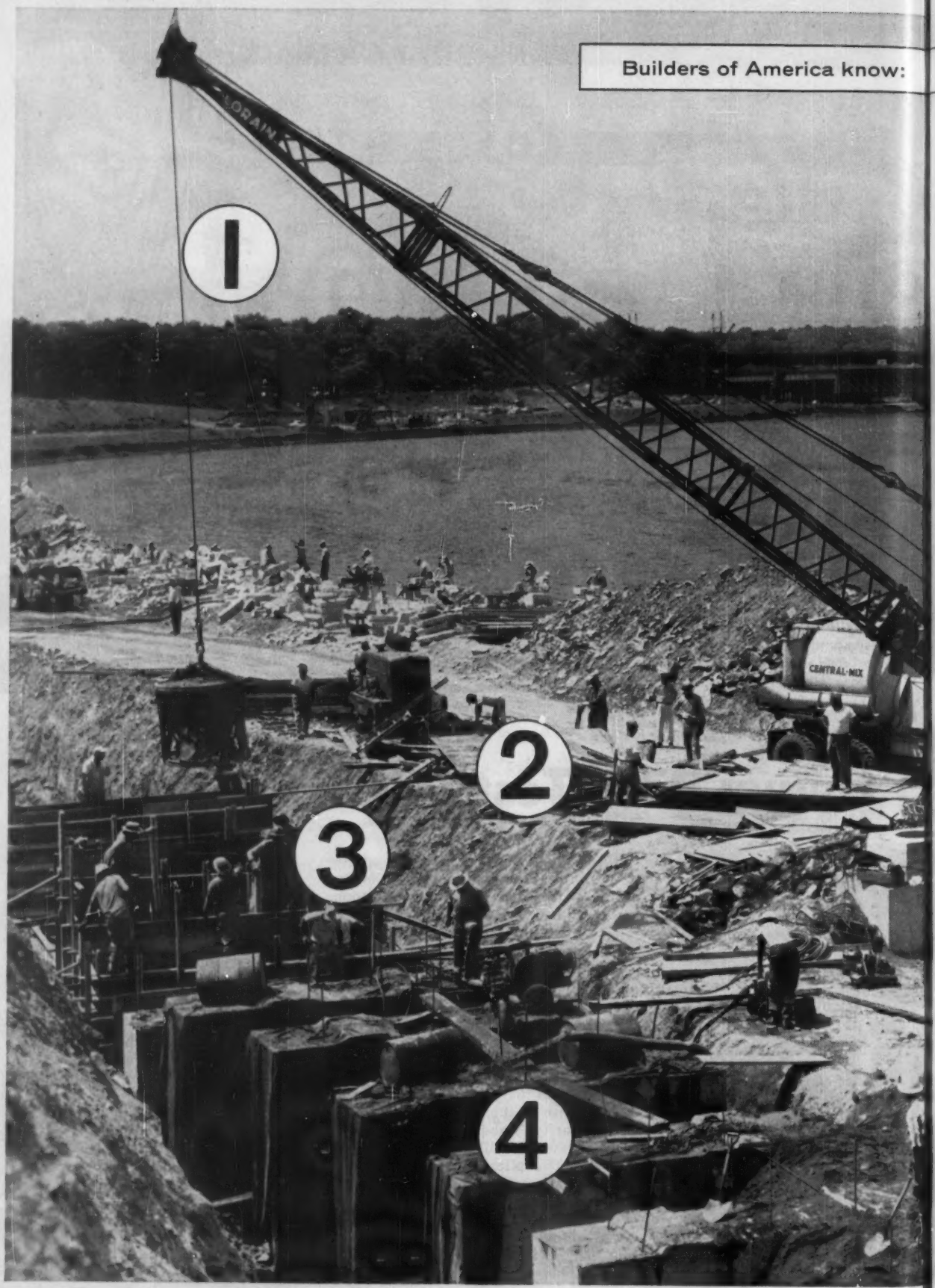
Concrete Technology Corp. cast the piles in its Tacoma plant and trucked them 30 mi to the job site. MacCrae drove the 266 required at a rate of 7 or 8 a day.

The completed overpass will consist of three parallel viaducts each 1,394 ft long. Two are 60 ft wide, the other is 48 ft wide. MacCrae has a $2.3-million contract with the Washington State Highway Dept. to build the overpass, scheduled for completion next July.

Driving the Piles

The piles were unloaded at the site by two truck cranes—a 30-ton Lorain 424 and a 35-ton Lorain 425. Each pile was fitted with a lifting collar, and the same cranes positioned them in holes for driving.

continued on page 102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TEST FRAME—Crane lowers 4-ton steel ingots onto steel frame. Total weight of 390 tons is transferred to pile through hangers to check estimated capacity of 260 tons.

The holes were bored by a Calweld bucket auger. It first made a 36-in.-dia cut, then wings were attached to the auger to enlarge the hole to 54 in.

Holes had to be at least 10 ft deep to support the piles. Some were deeper where it was necessary to penetrate hard surface strata. A few were as deep as 35 ft to prevent damage to an adjacent trunk sewer. Bottoms of the holes were within about 5 ft of final bearing level of the piles. After the piles had been placed in the holes, an Oliver C-46 front-end loader filled the opening around the piles with earth.

The larger crane then lowered a special driving frame over the top of the pile. The frame was 30 ft high. It was made of 10-in. 42-lb H-sections with two legs extending down on each side of the pile. On these legs were two semicircular bands that went around the pile to hold the frame vertical. One band was near the top of the pile and on one side of it; the other band went around the other side of the pile but lower down.

The driving head consisted of a 7,500-lb steel casting with six 1-in. layers of hardwood to act as cushions. Specifications called for a 42,000-ft-lb hammer, so MacCrae used a Vulcan O-14 single-acting air hammer with a 14,000-lb ram. Air was supplied by two 600-cfm Jaeger compressors feeding through a 3x8-ft receiver.

Deck Girders

The prestresseed concrete girders that will carrry the roadway ranged up to 110 ft in length and up to 38 tons in weight. They were pre-tensioned, making them among the biggest girders of their type (most girders this size are post-tensioned). Each girder had a 7-wire strand, composed of 7/16-in., stress-relieved uncoated wire, stressed to 19,500 lb.

Associated Sand & Gravel Co. cast 680 of these girders at their Everett plant. At the erection site, the two Lorain cranes unloaded the girders directly onto the pile caps. They placed about three girders per day, completing about three spans every two weeks.

Pile Test

The specifications required MacCrae to carry out a load test on the piles to check the accuracy of the 70-year-old Engineering News formula. Some experts question the effectiveness of the formula for dynamic drivers on heavy piles, especially where the soil is plastic.

In this case the soil was largely glacial till, and granular in nature. So the test, as might have been expected, indicated a close correlation between the actual pile capacity and the capacity as predicted by the formula. But it is interesting to note that the formula also worked, in this case at least, for extra heavy piles.

The formula is: $P = 2Wh/S + 0.1$, where P is the allowable load on the pile, W is the weight of the hammer, h is the stroke in ft, and S is the average penetration in inches for the last few blows.

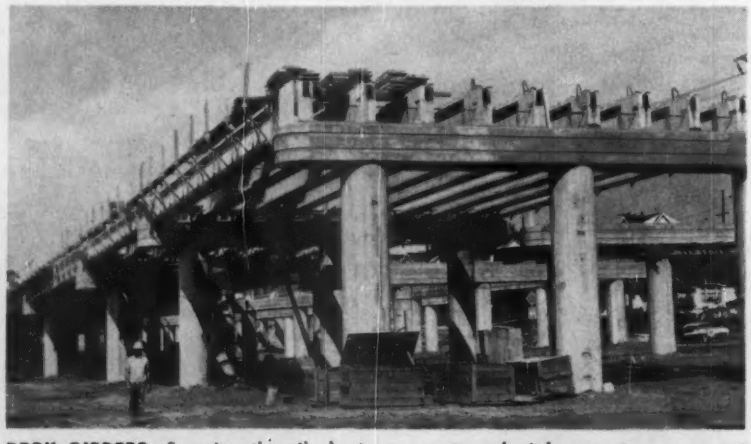
The piles were driven to a 260-ton bearing capacity as calculated by the formula. Then the first three piles were tested with a 50% overload. Maximum settlement during a 48-hr test was ⅛ in., indicating a safety factor of at least 1½.

The load was supplied by 400 tons of 4-ton steel ingots placed on a 16x16-ft steel frame that rested on a timber-pile supported platform. A steel helmet was placed on top of the pile and a jacking frame placed on top of that.

Four hangers connected the loading frame and the jacking frame. Each hanger consisted of four 4x4x7/16-in. angles connected to the two frames with ¾-in. high tensile bolts.

Four 150-ton hydraulic jacks, supplied by the Elgood Equipment Corp. of New York transferred the test load to the piling.

For MacRae Bros., Ralph W. Finke is construction engineer and Robert Currie is superintendent. W. E. McKibben is district engineer for the highway department, and Pierre Henrichsen is resident engineer.



DECK GIRDERS—Spanning the pile bents are prestressed girders ranging up to 110 ft in length and 38 tons in weight. They were pre-tensioned in an off-site plant.

DIG TRENCH AND BELLHOLES IN SINGLE PASS

The Cleveland JS-30 Trencher digs bellholes at pipe joints, digs flush to obstructions, slopes as it digs.

Note the ample-width bellhole in the foreground above. The JS-30's exclusive power-shifted digging wheel shifts 2½ feet to each side of center to dig bellholes like this and to keep trench in line even when crawlers are being steered around side obstructions.

The JS-30's wheel power-*tilts*, too—saves blocking and cribbing when either crawler track is higher than the other on curbs, side slopes, etc.

Note, too, how the JS-30's power-shifted V conveyor with operator-controlled speeds up to 1,000′ per minute—another Cleveland exclusive—easily handled the big spoil volume from the wide-sloped trench. The JS-30 sloped the trench to 6′ top width as it dug.

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"Based on our experience with the crusher, feeder, and an Austin-Western grader, I'd say that the Baldwin-Lima-Hamilton Corporation turns out quality products which hold up longer and do better jobs than most competitive equipment."—*George H. Souter, Gargaro & Souter, Inc., Detroit.*

Lima Austin-Western offers a complete line of top quality crushing, screening and washing equipment. The finest materials, skilled workmanship, simplicity of design, and engineering experience are reflected in performance records. Depend on Lima Austin-Westerns for accurately sized gravel in quantity and years of trouble-free service. Choice of compact, self-contained portable units or custom-engineered stationary installations. Both types assure you high-speed operation and lower tonnage costs. Ask a Lima A-W owner. See your nearest Lima Austin-Western distributor for facts and figures. Or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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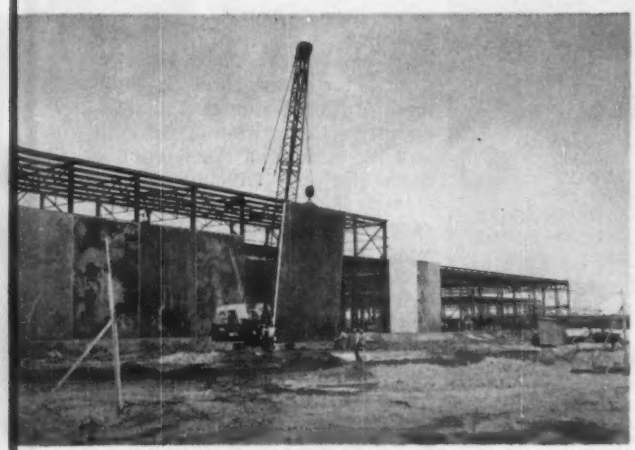
6038

Circle 104 on Reader Service Card

Extra Large Precast Panels Speed Erection Of Factory



ERECTING THE PANELS—Crane lifts one 22-ton panel off a casting bed and prepares to place it on building. Contractor spaced 20 beds around site to keep haul distances short.

EFFICIENT POURING and erecting of unusually large precast wall panels were big factors in speeding the construction of a major new tire plant for the General Tire & Rubber Co. in Mayfield, Ky.

Foster & Creighton Co. of Nashville, Tenn., the general contractor on the job, had a $5-million contract for the construction work. They finished on schedule in spite of a tough foundation situation, a major extension to the contract (but no extension of the deadline), and an abnormally severe winter.

The plant contains 582,000 sq ft of floor space. It has a structural steel frame with precast concrete walls on the first floor and an aluminum siding on the upper floors. The entire structure, including 8-in. concrete floors, required 25,000 cu yd of concrete.

Heavy Panels

A typical wall panel is 20 ft wide, 29 ft high, 6 in. thick and weighs 22 tons. About 175 were required for the plant. The majority were plain, but some had doors or windows in them. There were six different types of panel, according to door and window location.

Foster & Creighton set up 20 casting beds around the outside of the plant. They cast eight panels in each bed, so the longest distance they had to haul a panel from bed to building was about 80 ft.

At first they tried to cast one panel at a time, with one 12-in.-high form per bed. They lifted the same form up 6 in. for each panel until they had a stack of eight. But this proved to be too expensive and time-consuming.

So they built at each bed a form 4 ft high that could handle all eight panels. They were limited to a 4-ft form, and hence an 8-panel stack, by the height of the chute on a ready-mix truck. Eight were about all they wanted to pour at a time anyway, because of the haul distance to the building.

The floor of each bed consisted of a 4-in. thick concrete pad. The side forms were plywood sheets. The panel reinforcing acted as tie rods to hold in the sides during the pour. The reinforcing consisted of a single, centrally placed mat of ½-in. and ⅝-in. bars on 12-in. centers each way. Superior open end coil ties were welded to the ends of some of the bars to provide sockets for tie wires through the forms.

At six points in the slab, Superior pick-up inserts were welded to the reinforcing. During an actual lift, three short cables were connected to pairs of lift hooks. Each cable was looped over a pulley. The three pulleys were mounted on a single spreader on the load line of a 50-ton Bucyrus-Erie crawler crane.

Foster & Creighton poured one panel every two days at each bed. During the peak of the operation they had 6 to 10 beds in operation all the time. Generally they worked only one shift in spite of the tight schedule.

The panels were connected to WF steel columns in the building by a simple bolted clip angle. The bolts were spot welded after the connection had been made. A ½-in. gap between the panels was filled by stuffing paper in the center of the gap and grouting in the cracks on each side.

One advantage of precasting showed up after all the walls were in place. Foster & Creighton had some concreting to do inside the building and they wanted to bring in a ready-mix truck. The doors were wide enough for the truck, but none was high enough. So a crew disconnected one panel containing a door and jacked it up 18 in. to let the truck in.

Crews worked all winter in spite of unusually cold weather. They were slowed somewhat, but they continued to pour panels under heated tents over the beds.

The initial site preparation involved 250,000 cu yd of earthmoving. Foster & Creighton had to lay a 6-ft pad of gravel over the site. Through this they placed 250 drilled caissons, 12 to 15 ft deep, to provide a foundation for the building.

For Foster & Creighton, Walter S. Spence was project manager, Ray Wilson and Glenn Fite were field superintendents, and Paul Bond was foreman in charge of the panel operation.

For General Tire, Glenn Orr is chief engineer and Robert Foster was resident engineer on the job. H. K. Ferguson Co. was in charge of engineering and construction management. Their project manager was Joseph P. Martin.

Construction Men in the News . . .

Moles Name 1961 Award Winners

HARRY T. IMMERMAN (left) and HERMAN BROWN are the recipients of the 1961 Moles Awards for outstanding achievement in construction. They are the 21st pair to receive plaques given annually by the Moles since 1941 to one member of the society and one non-member. Immerman, the member, is vice president and chief engineer of Spencer, White & Prentis, a New York City heavy construction firm that specializes in foundation and underpinning projects. Brown is president of Brown & Root of Houston, Tex., a construction firm whose principal clients are oil, chemical, and industrial concerns.

Immerman joined SWP in 1923. He is an expert in foundation, underpinning, and shoring problems, and has served as a consultant to industry and government on these subjects. He was chief engineer for the construction of Lewisohn Stadium in New York City, and designed and supervised the installation of New York's first all-steel subway decking system.

Brown founded his firm in 1914 shortly after graduation from the University of Texas. Since then, the company has been responsible for the construction of more than $2-billion worth of construction projects throughout the world. He has organized associate companies to give the parent firm unified control of engineering, design, and construction.

Announcement of the winners was made at a recent Moles dinner in New York City by Richard E. Mynatt, chairman of the Awards Committee. The plaques will be presented at the annual Moles dinner Jan. 25 in New York.

Elected Governor

JOHN A VOLPE, president of John A. Volpe Construction Co. of Malden, Mass., and 1960 president of the Associated General Contractors of America, is the governor-elect of Massachusetts. Running on the Republican ticket, he obtained a 135,000 vote plurality to defeat Democratic Secretary of State Joseph D. Ward.

Emerson

RALPH E. LAUBSCHER is the new president of the Sam W. Emerson Co. of Cleveland. He was vice president in charge of construction for the firm since 1919. Laubscher succeeds Sam W. Emerson, founder of the firm, who becomes chairman of the board.

GEORGE T. SEMPLE is the new vice president, succeeding Laubscher. Semple joined the firm in 1936 and has headed some of its more important jobs.

Burns & Roe

WILLIAM G. CARLSON is now director of defense and aeronautical projects for Burns & Roe, Inc., engineers and constructors of New York City and Santa Monica, Calif. The step is described as an organizational move designed for more efficient control of project work.

AGC Nominees

M. CLARE MILLER and FRANK F. BURROWS are the nominees to head the Associated General Contractors of America in 1961. Miller, currently vice president, will succeed John Volpe as president. Burrows will succeed Miller as vice president.

Both men were nominated at a recent meeting of the AGC governing and advisory boards at Phoenix, Ariz.

Miller heads the San Ore Construction Co. of McPherson, Kan., a firm founded by his father in 1921. The company is active in the construction of highways and other heavy projects.

Miller has served as former chairman of the AGC's Highway Contractor's Div., and co-chairman of the National Joint Cooperative Committee of the AGC and the American Association of State Highway Officials. He has served as a spokesman for the construction industry in testimony before congressional committees concerned with the federal highway program. In addition, he was president of the Kansas Contractors Association, an AGC chapter, for three terms.

During World War II, Miller was a construction chief for a sector of the China-Burma-India Theatre, and was awarded the bronze star for his work in the construction of B-29 airfields. In the Korean action, he served as commanding officer of the 439th Engineer Construction Battalion.

Burrows is president and general manager of Williams & Burrows, Inc., of Belmont, Calif. He joined the firm in 1925 when it was located in San Francisco and known as G. W. Williams Co. In 1944 the company name was changed to its present form and Burrows became vice president and general manager. He assumed his present position in 1959. The company is primarily engaged in building construction.

Burrows has served as vice chairman and chairman of the AGC's Building Contractors Div. and as a member of the association's governing board and its executive committee. He was also president of the Central California Chapter of the AGC.

Giant Armco Pipe Replaces Old Bridge

Corrugated metal drainage structures are now being built *larger* and *lighter* than ever before thought possible. The method, calling for the corrugated metal conduit to act as a compression ring, has evolved from Armco's extensive laboratory research and almost 60 years of field experience. This method *greatly reduces costs!*

In this specific case, an 18-foot diameter, 7 and 10 gage Armco MULTI-PLATE® structure—much lighter than shown in present gage tables—replaced an old county bridge in Ohio.

How was this designed and installed? A full report, presented to the Highway Research Board in Washington, D. C., this year, outlines the methods used. A copy of this report, "The Corrugated Metal Conduit as a Compression Ring," is yours for the asking. Just send in the coupon. Armco Drainage & Metal Products, Inc., 7270 Curtis Street, Middletown, Ohio.

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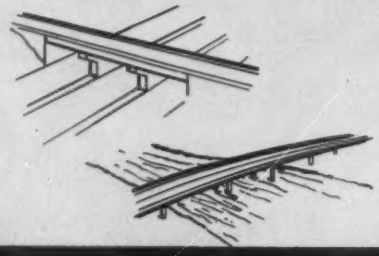

SUPERIOR Heavy-Duty SCREED SUPPORTS

Made to take the heavy loads of traveling vibratory screeding equipment.

Designed for use with 1¼" and 1½" I.D. pipe screeds, Superior Heavy-Duty Screed Supports provide a simpler and faster method of supporting the loads of heavy traveling screeding equipment. Only the inexpensive bases are left in the concrete. The adjustable holders are easily removed, together with the pipe screed, because the holders are set, not threaded into the base. The nut covers the base opening and prevents concrete from entering.

METAL BASE TYPE

2 Types

ADJUSTABLE—RE-USABLE

METAL BASE TYPE for use on Structural Steel is tack-welded to the top flange on about 4' centers. The Screed Holder is set into the base and adjusted for height by turning the nut. The threads are fast — 3-to-the inch, of a contour type, non-clogging and easily cleaned.

CHAIR BASE TYPE for use on wood or plywood decks is easily secured to the deck by nailing across the upturned legs. Note that this base has three legs for positive stability. . . . If desired legs can be supplied of galvanized wire.

CHAIR BASE TYPE

For details request Catalog 700.

SUPERIOR Standard SCREED CHAIRS

For formed slabs 4½" and greater in thickness.

With re-usable adjustable screed holders using 1" I.D. pipe and rectangular bars for screeds.

Screed Chairs for slabs on fill are also available.

NOTE — This design offers greater strength and stability than individual unconnected legs.

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Circle 108 on Reader Service Card

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distribution, sales personnel and other activities.

Distributor Appointments

Highway Equipment Co.: Municipal Sales Co. of Richmond has been appointed distributor for the State of Virginia except for the counties of Loudoun, Fairfax, Fauquier, Price William, Northampton and Accomack. Two distributors have been appointed for Ohio. Cleveland Contractors Equipment Co. of Cleveland will serve all markets except governmental buyers. Corry Engineering, Construction and Supply Co. of Galion will serve only government (state and local) buyers.

Midland Products Co.: Distribution of Midland contractors pumps is now being handled by Fletcher Equipment & Supplies, Inc. of New Orleans, and Casey & Emmert, Inc. of Chicago.

The Eimco Corp.: H. C. Ormes Construction Co. of Minneapolis, Minn., has been appointed sales and service dealer for Eimco

The Warner & Swasey Co.: The following distributors for the Gradall and Hopto line have been announced: The M-W Equipment Co. of Philadelphia; The Highway Equipment & Supply Co. of Harrisburg, Pa.; The Bark River Culvert & Equipment Co. of Eau Claire, Wis.; and H. B. Owsley & Son, Inc. of Charlotte, N. C.

General Motors Corp.: The following distributors have been appointed: Johnson & Towers Baltimore Inc., of Baltimore; and Lawless Brothers, Inc., of Bakersfield, California.

On the Sales Front

Duff-Norton Co.: Donald A. Anderson has been appointed New York District sales manager for the Jack Division and the Coffing Hoist Division. He was formerly district sales manager in upstate New York and New England.

continued on page 111

Circle 109 on Reader Service Card ➤

Ask the man who runs the rig...

no one makes a tougher tooth than ESCO

The right design, the right steel, the right shape make *ESCO* Points and Adapters right for every digging condition.

The earth moving industry looks to

Electric Steel Foundry Co., PORTLAND, OREGON

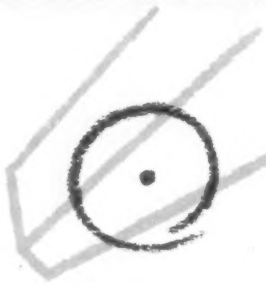
See reverse for shapes and size range

Here are the points to remember...

12M ALLOY STEEL

ESCO 12M Points are the toughest you can buy. Developed through years of research for the construction industry, cast *ESCO* 12M is carefully heat treated to produce the finest steel made for the severe shock and abrasion encountered by points and adapters.

RIGID QUALITY CONTROL TESTS ASSURE TOUGHNESS, HARDNESS



Every *ESCO* Point is Brinell tested to assure the exact degree of shock-absorbing toughness and abrasion-resisting hardness for longer digging life. Be sure to look for the Brinell mark on every *ESCO* Point you buy.

8 POINT SHAPES

You can select from eight different shapes to find the point that matches your digging conditions. *ESCO* Points are designed by bucket and excavation specialists who know how to achieve top digging performance. The self sharpening design of an *ESCO* Point makes it start sharp and stay sharp.

ESCO Points and Adapters for all digging equipment

Your local ESCO dealer can supply Points and Adapters for all your digging needs. By using ESCO Points and Adapters on all your equipment you can cut costs further by reducing your point inventory and consolidating purchases. Call your ESCO dealer today for details. He's listed in the yellow pages of your telephone directory. Or, write direct.

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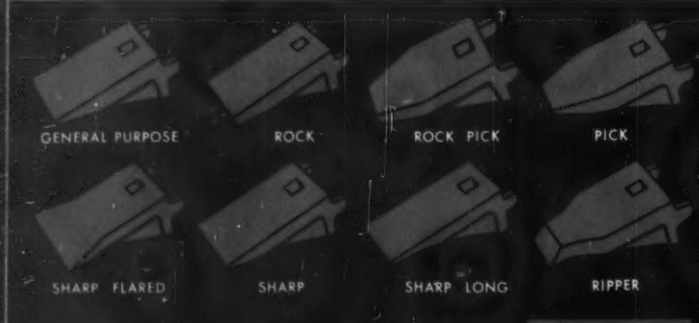

ESCO Point shapes . . . start sharp, stay sharp and last longer under any digging condition.

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Circle 152 on Reader Service Card

SALES AND SERVICE . . .

continued

Mine Safety Appliances Co.: Richard E. Miller has been appointed product line manager for eye and face protection equipment.

American Road Equipment Co.: The following three regional sales managers have been appointed: George E. Smith, Jr. in the Western territory; Merrill Sedgwick, covering mid-continent; and J. M. Leary, in the Eastern states.

In the Main Office

Thew Shovel Co.: Nils Lou has been appointed director of operations of the company. He will be in charge of all manufacturing operations, industrial engineering, and production planning and control.

Alloy Rods Co.: F. L. Blodgett has been appointed general manager of the company's Hard Surfacing Products Division. Prior to this appointment, he was general sales manager for the company.

Bucyrus-Erie Co.: Eugene P. Berg has been elected executive vice president of the company. He previously was general manager of all Chicago operations.

Associations

Contractors Pump Bureau: John H. Hase, C.H.&E. Mfg. Co., was elected chairman of the Bureau for the coming year and C. H. C. Van Pelt, Jr., McGowan Pump Division, Leyman Mfg. Corp. was elected vice-chairman. New members elected to the Board of Governors were Andrew T. Roulston, Hale Fire Pump Co., and R. D. Houghton, Rice Pump & Machine Co. The other member, whose term continues, is J. C. Gorman of The Gorman-Rupp Co.

Special Mention

The White Motor Co.: Stockholders of The White Motor Co. and the Oliver Corp. have approved White Motor's purchase of Oliver's farm equipment business. White Motor is in its 60th year as a heavy-duty truck maker while Oliver has been producing farm equipment for 112 years. The Oliver Corp. has changed its name to Cletrac Corp., since White Motor now has exclusive right to use the name Oliver. Samuel W. White, Jr., has been named president of the Oliver subsidiary.

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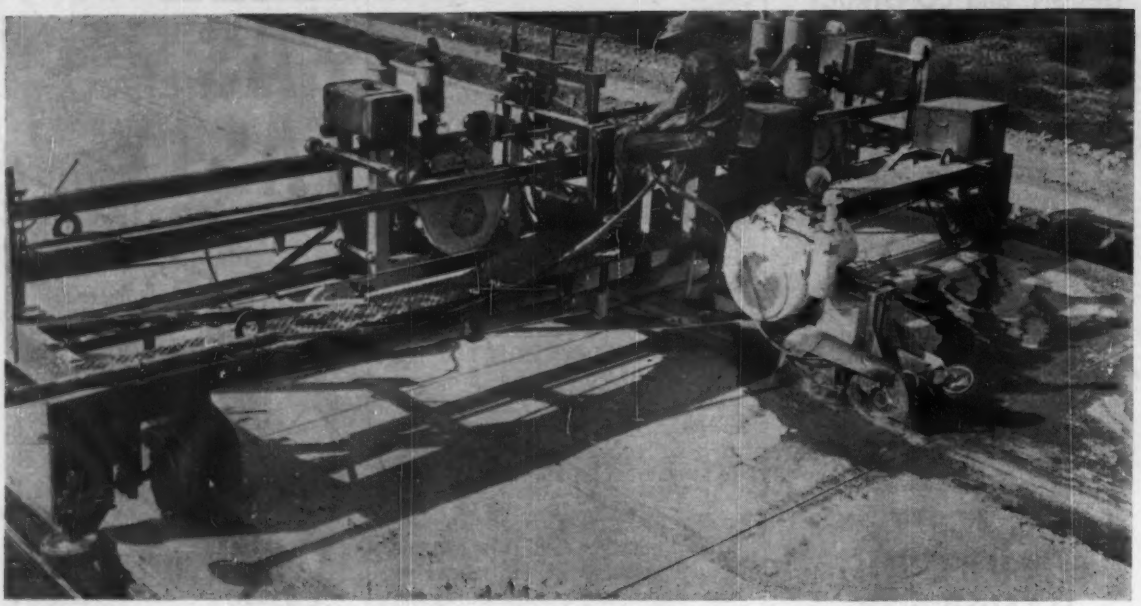
Circle 111 on Reader Service Card

Construction Equipment News

For more information on any item, circle the key number found at the end of each item, on the READER SERVICE CARD just inside the back cover.



Saw Cuts Contraction Joints In Two Directions

One man and one machine can cut both longitudinal and transverse contraction joints in concrete slabs from 18 to 25 ft wide. The rig is a Concut Jointmaster with a longitudinal sawing attachment.

Four diamond saws cut the joint across the slab, and two saws in tandem cut the longitudinal joint. Each of the tandem saws cuts half the depth of the joint. A hydraulic ram raises and lowers the saws.

The longitudinal sawing attachment is powered by a separate 36-hp Wisconsin engine. Two engines, either 36-hp Wisconsin or 70-hp Hercules, power the four transverse saws on the Model 2400 sawing rig.—Concut Sales, Inc., Elmonte, Calif.

Circle **301** *on Reader Service Card*

Ford Adds Diesels to 1961 Line

Diesel-powered truck tractors will be available from Ford for the first time in 1961. A choice of five Cummins engines delivering 180 to 220 hp will power the tractors. Their gross combination weight ratings range from 55,000 to 76,800 lb.

Other models include the extra heavy duty T-850 with a maximum gvw rating of 45,000 lb. These trucks are powered by V-8 engines delivering from 206 to 266 hp. In all, Ford has added more than 100 models of trucks to their line.—Ford Div., Ford Motor Co., P.O. Box 608, Dearborn, Mich.

Circle **302** *on Reader Service Card*

Rig Produces Many Cross-Sections

Narrow bituminous pavements to fit any cross-section can be placed easily with the Contour Trac-Paver. The form sections of its screed are interchangeable to produce special shapes for gutters, ditches, sidewalks, and similar installations.

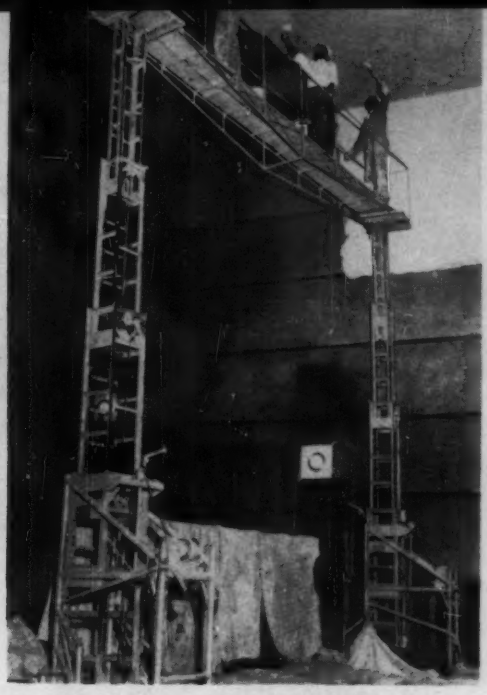
The unit's hopper capacity is 5,000 lb. A conveyor feeds the material from the hopper to distributing screws in front of the screed. The screed is heated by LP gas burners and is equipped with a hydraulically driven vibrator that produces a force of 3,000 lb.—Trac-Machinery Corp., Nunda, N.Y.

Circle **303** *on Reader Service Card*

Three New Trucks Join Chevrolet Line

A total of 168 models of Chevrolet trucks are available for 1961. They range in size from ½-ton pickups to 36,000-lb gvw tandems. Pickups added this year have a 127-in. wheelbase and are rated from 4,900 to 5,600 lb gvw. Their four-wheel drive, optional last year, is now standard. Engine choices for the entire line range from 135-hp, 6-cyl units to 230-hp V-8's.—Chevrolet Motor Div., General Motors Corp., General Motors Bldg., Detroit 2, Mich.

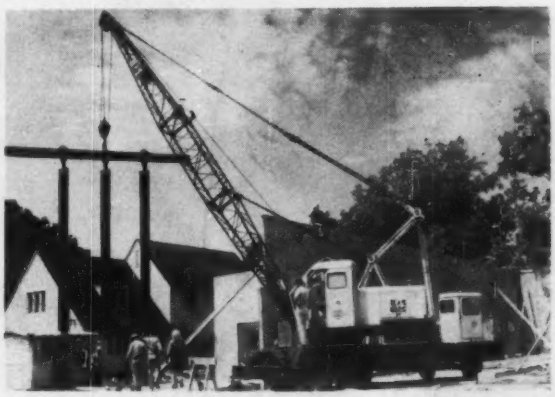
Circle 304 on Reader Service Card



Scaffold Increases Work Space

Overhead work can be done faster with a bridge-type work platform because several men can stand on it at the same time. The platform is supported on two Hi-Lift extension scaffolds that reach to any height up to 26 ft. The entire unit can be disassembled in less than 30 min.—Atlas Industrial Corp., 849 39th St., Brooklyn 32, N.Y.

Circle 305 on Reader Service Card



Truck Crane Handles Long Boom

Rated capacity of the P&H Model 255B-TC crane is 20 tons. This is figured with a 40-ft boom at 12-ft radius. For maximum reach the crane mounts a 110-ft boom and 30-ft jib combination. With it the rig can deliver a 5,500-lb load 12 stories above ground, or position 4,300 lb 60 ft away.

Maximum highway speed is 40 mph. When necessary, the crane with its standard 40-ft boom can handle dragline or clamshell buckets or a pile driver. A backhoe attachment that digs to a depth of 21 ft also is available.—Harnischfeger Corp., 4444 W. National Ave., Milwaukee 16, Wis.

Circle 306 on Reader Service Card

Grader Attachment Finishes Slopes

Motor graders with a Grade-More slope grader attachment can finish slopes, clean ditches, maintain irrigation canals, or do other jobs that require a sloped finish. The Model U-16 slope grader bolts to the motor grader frame and is controlled by a self-contained hydraulic system powered by the scarifier output shaft.

Two controls actuate the unit's 16-ft moldboard. One control moves it up and down and to the side; the other control adjusts the blade to the required degree of slope and applies down pressure.—Hasselbalch & Sons, 1112 Capitol Ave., Omaha, Neb.

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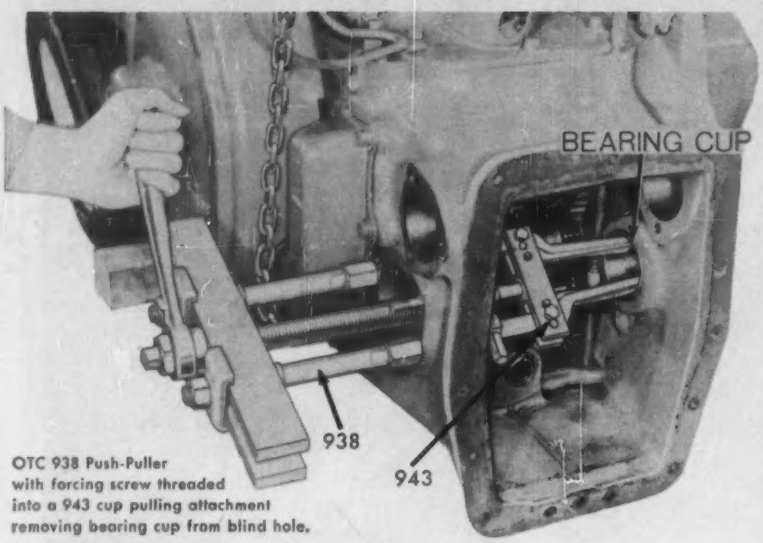
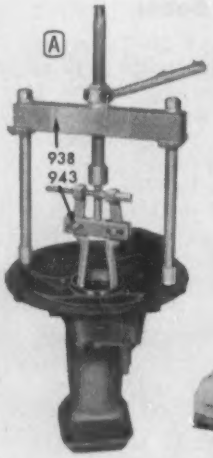


OTC 938 Push-Puller with forcing screw threaded into a 943 cup pulling attachment removing bearing cup from blind hole.

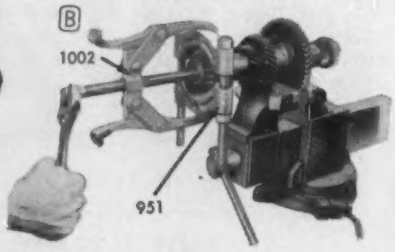
Save time, cut costs in removing and installing cups, bearings, gears, seals, pulleys, etc., with versatile OTC pullers

Save time, up profits by having the right tools in your shop to get the job done quickly, safely, easily — versatile OTC pullers with attachments. Manual or hydraulically operated . . . fit all makes of equipment. Complete hydraulic maintenance sets available in 17½, 30 and 50-ton capacities.



A Pulling rear axle inner bearing cup without damage or distortion to parts with some OTC-Push-Puller unit shown above.

B Removing transmission main shaft front bearing quickly and easily with OTC 1002 Grip-O-Matic puller and 951 bearing pulling attachment.



FREE CATALOG

See your OTC distributor or write for further information.

RESEARCH · ENGINEERING · DEVELOPMENT

OTC

OWATONNA TOOL COMPANY

380 Cedar Street, Owatonna, Minnesota

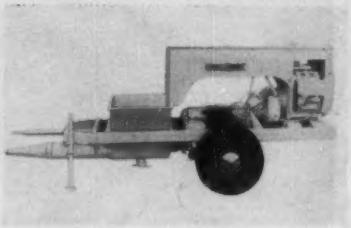
Cable Address: TOOLCO

Designers and manufacturers of the world's most complete line of Maintenance Tools and Hydraulic Equipment.

Circle **114** *on Reader Service Card*

EQUIPMENT NEWS...

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.



Trailer-Mounted Grout Pump

Concrete can be pumped to a height of 10 stories or over distances of 300 ft horizontally with a new portable grout pump. The Grout King delivers up to 20 cu yd of concrete per hr. It is powered by a 30-hp air-cooled engine and is equipped with a three-speed transmission with one reverse gear for easier clean-out.—Challenge-Cook Bros. Inc., 3334 San Fernando Rd., Los Angeles 65, Calif.

Circle **307** *on Reader Service Card*

Gasoline Engine Drives Portable Drill

Total weight of the Port-O-Drill is only 30 lb, and it can operate at any angle because fuel is supplied to the engine under pressure. The engine is a 2.2-hp, 2-cycle, air-cooled unit equipped with a recoil starter and a shielded spark plug cover. According to the manufacturer, the drill handles metal, masonry, and rock drilling, wood boring, and earth augering.—Schnacke Mfg. Corp., 1016 E. Columbia St., Evansville 7, Ind.

Circle **308** *on Reader Service Card*

Job for Autocar... This six-wheel drive C5566 gets the mix to the site regardless of weather or terrain.

New 6 x 6 mixer goes through thick and thin . . . thanks to Autocar

This is really an all-weather, all-terrain job—one of those where nothing less than an Autocar would do.

In a hole or up a hill, on shifting sand or in sticky gumbo, this all-wheel-drive Autocar delivers the mix on schedule . . . a schedule that construction men know they can depend on day in and day out.

Choice of an Autocar means that your truck will be custom-engineered to its specific job. Precision building plus Autocar quality means that it will stay on the job longer with greater economy. Why settle for less than the "World's Finest?"

White-Autocar comprehensive service throughout the U. S. A.

Autocar
"World's Finest"

Division of
The White Motor Company
Exton, Pa.

Circle 115 *on Reader Service Card*

NEW!

Homelite Pumps and Generators with **4-Cycle** Engines

New Homelite Model 44S2, 2" pump with Briggs & Stratton 4-cycle engine.

New Homelite Model 46A115, 1500 watt generator with Clinton 4-cycle engine.

For Greatest Value at Lowest Cost

NOW you can choose the exact portable pumps and generators your jobs require from the most complete line of models ever offered by any manufacturer: economical, 4-cycle engine driven units or finest-quality models driven by Homelite's famous, 2-cycle engines.

Homelite's new carryable pump and generator units driven by 4-cycle Briggs & Stratton, Clinton and Wisconsin engines give you Homelite-quality in construction, performance and service at new low prices. Pump sizes: 1½", 2" and 3" centrifugals and 3" diaphragm. Generator sizes: 1500, 3000 and 4500 watts. Your choice of gasoline or LP gas operated engines. Compact and lightweight, these units can be carried anywhere they are needed.

Write or call for complete information and a demonstration on your job. Do it today!

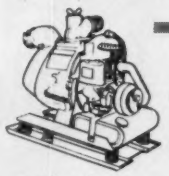
Homelite factory branches are located throughout the country. Your nearest one is as near as your phone. Call them or write for convincing demonstration or rapid service in any way.

HOMELITE

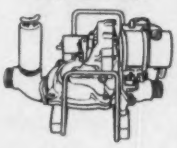
CARRYABLE PUMPS • GENERATORS
BLOWERS • CHAIN SAWS

HOMELITE • A DIVISION OF TEXTRON INC., 1012 RIVERDALE AVE., PORT CHESTER, N. Y.
In Canada — Terry Machinery Co., Ltd.
Circle **116** *on Reader Service Card*

HOMELITE Factory Branches throughout the country sell and service Homelite's complete line of carryable construction equipment.

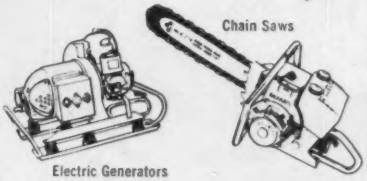


Diaphragm Pumps



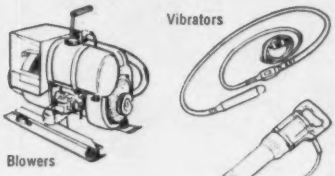
Centrifugal Pumps

Chain Saws



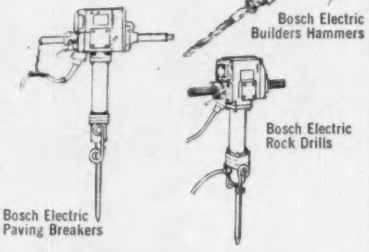
Electric Generators

Vibrators



Blowers

Bosch Electric Builders Hammers



Bosch Electric Rock Drills

Bosch Electric Paving Breakers

HOMELITE FACTORY BRANCHES

EAST: CONNECTICUT: Greenwich, Hartford • NEW JERSEY: North Arlington, Woodbridge • NEW YORK: Albany (Latham), Buffalo, New York (North Arlington, N. J.), Rochester, Syracuse • MAINE: Orono • MARYLAND: Baltimore • MASSACHUSETTS: Boston (Allston) • PENNSYLVANIA: Altoona, Erie, Harrisburg, Hazleton, Philadelphia, Pittsburgh, Malvern • VIRGINIA: Arlington, Richmond, Roanoke • WEST VIRGINIA: Charleston, Clarksburg

SOUTH: GEORGIA: Atlanta • FLORIDA: Jacksonville, Miami • LOUISIANA: New Orleans (Metairie), Shreveport (Bossier City) • NORTH CAROLINA: Charlotte, Raleigh • OKLAHOMA: Oklahoma City • TENNESSEE: Knoxville, Memphis • TEXAS: Dallas, Lufkin

MID-WEST: ILLINOIS: Chicago (Stone Park) • INDIANA: Indianapolis • MICHIGAN: Detroit, Grand Rapids • MINNESOTA: St. Paul • MISSOURI: Kansas City, St. Louis • NEBRASKA: Omaha • OHIO: Cincinnati, Cleveland, Toledo • WISCONSIN: Milwaukee

WEST: CALIFORNIA: Fresno, Los Angeles (Alhambra), Sacramento, San Francisco • COLORADO: Denver • OREGON: Portland • UTAH: Salt Lake City • WASHINGTON: Seattle, Spokane

HOMELITE

A DIVISION OF TEXTRON INC.

1012 Riverdale Ave., Port Chester, New York

In Canada:

TERRY MACHINERY CO. LTD.

EQUIPMENT NEWS...

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

New Truck Crane

Rated capacity of Link-Belt Speeder's HC-77 Zephyrcrane is 25 tons. Its working weight is about 56,000 lb; and the overall width is only 8 ft, permitting it to travel on most highways without major disassembly. But when stripping is necessary, the counterweight and front and rear box outriggers and their sliding beams can be removed.

The crane is mounted on a carrier built by Link-Belt Speeder. Its features include: power steering, screw-type outrigger jacks, independent emergency brake system, air-actuated digging brakes, and a lock-out device on the differential that improves traction for off-the-road travel. —Link-Belt Speeder Corp., 1201 Sixth St., S.W., Cedar Rapids, Iowa.

Circle 309 on Reader Service Card

Plastic Hose Feeds Automatic Nailer

Nails and screws can be dumped in bulk into a power hopper unit, and they are fed point first through a transparent flexible hose to lightweight automatic fastening tools. The Powasert tools are air-driven, portable automatic nailers and screwdrivers that accept fasteners directly from bulk shipping containers.

Power is adjustable for flush or countersunk insertion, and the tool leaves no mark on the surface of the work. Controls are arranged so that nails and screws cannot be fired into the air.—United Shoe Machinery Corp., 140 Federal St., Boston 7, Mass.

Circle 310 on Reader Service Card

"GJ-BOSS"

GROUND-JOINT FEMALE COUPLING, STYLE X-34

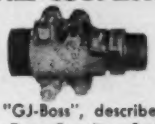
SO *Reliable* FOR PILE DRIVING

...AND ANY STEAM, AIR, WATER AND HYDRAULIC SERVICES... HIGH OR LOW PRESSURE

Washerless

Unequalled for safety, efficiency and long service life. Ground-joint union between stem and spud provides leak-proof, trouble-free seal... no lost or worn-out washers to replace. All parts malleable iron or steel, rustproofed. Furnished with superstrong "Boss" Offset and Interlocking Clamps. Sizes ¼" to 6", inclusive.

COMPANION MALE COUPLING "BOSS" STYLE MX-16



Companion coupling for "GJ-Boss", described above, and "Boss" Washer Type Couplings Style W-16. Each size fits same size hose... oversize hose not required. Furnished with "Boss" Offset and Interlocking Clamp. Sizes ¼" to 6", inclusive.

"BOSS" HOSE MENDER, STYLE BM-16

The practical, safe way to restore damaged hose to service. Fitting consists of corrugated mender tube and two "Boss" Interlocking Clamps. Tube has flanges to engage clamp fingers. Thoroughly rustproofed. Sizes ½" to 6"

Stocked by Manufacturers and Distributors of Industrial Rubber Products

DIXON

Valve & Coupling Co.

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.

BRANCHES—CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

DIXON VALVE & COUPLING CO., LTD., TORONTO. Associate Companies

Buckeye Company, Inc., Quarryville, Pa. · Precision Steam Steel Company, Camden, N.J.

Circle 117 on Reader Service Card

ANY WAY YOU FIGURE IT . . .

GM GENERAL MOTORS EUCLID

EUCLID

FOR MOVING EARTH, ROCK, COAL AND ORE

"Euc" Rear-Dumps are your best investment

Reliable job-proved performance, backed by competent and well stocked dealer parts and service facilities, makes "Euc" Rear-Dumps your best bet for top production at lowest over-all cost.

There are lots of ways to compare hauling equipment but no matter what method you use there's only one real measure — reliable performance on the job.

For over 25 years Euclid Rear-Dumps have been the outstanding choice of contractors, mines, quarries and industrial users of off-highway haulers. More than half of the orders for new "Eucs" are from previous owners — repeat business that is the best evidence of customer satisfaction with the product and the service available from Euclid dealers.

With this unequalled field experience and continuous product improvement, "Eucs" give you operating advantages that cut downtime and provide greater work-ability. An experienced dealer organization with complete parts stocks and service facilities is further assurance that your "Eucs" can always be kept in top shape wherever they may be working.

You can depend on "Eucs" and your Euclid dealer for bonus benefits that don't show in the specs but are mighty important in making Euclids your best investment.

EUCLID Division of General Motors, Cleveland 17, Ohio

Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland

Euclid pioneered many of the rear-dump features that are "standard" today . . . free floating springs, planetary type final drive, exhaust heated bodies, Torqmatic Drive with torque converter and semi-automatic transmission, double acting hoist and other engineering advances that cut hauling costs.

Fork Lift Handles Masonry Materials

Palletized masonry materials can be raised to a height of 7½ ft with the Model L-812 fork lift. The small rig can lift 1,000 lb at an 8-in. load center or 800 lb at a 12-in. load center. The two-section telescoping mast can be tilted for easier access to loads.

A 7-hp Wisconsin engine powers the L-812. Its load-carrying front wheels drive the unit, while the rear wheels handle steering.—The Prime-Mover Co., Muscatine, Iowa.

Circle 309 on Reader Service Card

Finisher Is Easy to Maneuver

Three of the four pairs of rubber-tired wheels on the Smith Mark IV finisher steer the rig, permitting it to pave around sharp turns. The operator's platform swings hydraulically from side to side to give the operator good visibility at all times.

Paving capacity is 400 tph; maximum paving speed is 102 fpm. Hydraulic folding hopper side wings help move materials without hand shoveling, and a swept back screed distributes the mix evenly. Demand paddles on either side automatically control the flow of asphalt mix to the roadway.—The T. L. Smith Co., 2835 N. 32nd St., Milwaukee, Wis.

Circle 310 on Reader Service Card

Power Brush Cleans Pavement Joints

A small machine equipped with a 9½-in.-dia rotating brush cleans pavement joints or cracks before sealing. The rig's steel wire brush rotates at 1,800 rpm and sweeps joints ¾ in. to 2½ in. wide to a maximum depth of 1½ in.

The unit weighs 165 lb. Its 7-hp air-cooled Kohler engine drives the brush through a dual V-belt. A third wheel holds the brush clear of the pavement when starting the engine. Brushes can be replaced in 60 sec.—G. H. Tennant Co., 721 N. Lilac Dr., Minneapolis 22, Minn.

Circle 311 on Reader Service Card

Air-Cooled Diesel Drives Roller

The Zettelmeyer VL 1a vibratory tandem roller weighs 3,000 lb and exerts a compaction effort equivalent to 12 tons. It is powered by an 8-hp air-cooled diesel engine and has two speeds in both forward and reverse. It can climb a slope of 1 on 4. Rolling width is 40 in., and the vibration frequency is 3,750 vpm. The roller is 87 in. long and has a turning radius of 15 ft. Rolls are equipped with water sprinklers as standard equipment. The roller is manufactured in Germany.—Zettelmeyer, 10 E. 40th St., New York 16, N.Y.

Circle 312 on Reader Service Card

◀ *Circle 119 on Reader Service Card*

As the building boom in Florida continues to meet and exceed all expectations, more and more Marions are being called upon to lend their muscles to the task.

This Marion 43-M has been swinging its 65 ft. boom around at a pretty mean rate — averaging some 1200 yds. every 10 hours in a 640 acre land development project near Ft. Lauderdale.

Being used for sewer and water line excavation as well as canal dredging, this 1 yd. dragline is typical of many Marions making a name for themselves in the Sunshine State. Your nearest Marion distributor has all the facts.

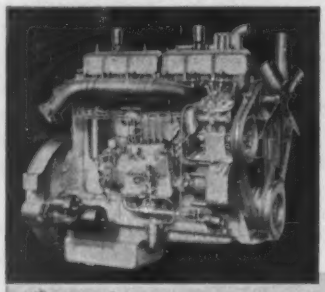
You get **MORE** *with* **MARION**

Marion Power Shovel Company, Marion, Ohio

A Division of Universal Marion Corporation

Circle 121 on Reader Service Card

MOST PRODUCTION with WAUKESHA POWER



A typical Waukesha medium six-cylinder Diesel. Other Diesel, gasoline, and gas models—up to 1200 hp.

For service—in any country—or any climate—stamina and dependability are built-in. Power packed—to pay profits in fast, smooth performance, fuel economy, and low upkeep—Waukeshas are the choice of operators and owners alike. Engine-Generator Sets (ENGINATORS®) for all standard fuels . . . from 50 to 800 KW.

488

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

Factories at Waukesha, Wisconsin, and Clinton, Iowa New York • Tulsa • Los Angeles

Circle 122 on Reader Service Card

EQUIPMENT NEWS...

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

Crawler Crane Is Easy to Transport

Biggest crawler crane in the Lorain line is the new 80-ton Model 880. It incorporates unique features that simplify disassembly for transportation. The rig's crawler frames can be removed by simply screwing retractable telescopic axles into the crawler body. Drive chains and tracks are left intact on their frames. And a tilting and folding mast gantry reduces the rig's overall height to the level of the cab top.

Two joy-stick levers control all major turntable operations. Two-speed travel in either direction is a standard feature. A smaller version of this crane, the 70-ton 870 also is available. This model incorporates all of the features of the 880.—The Thew Shovel Co., Lorain, Ohio.

Circle 313 on Reader Service Card

Level Deck Trailer

Use of USS T-1 high-strength steel cuts down the empty weight of trailers by as much as one third. Talbert's 35-ton level deck trailer weighs only 10,050 lb. Its deck measures 8x27 ft and is covered with oak and fir flooring. Other featuers are a rubber-mounted, three-axle spring suspension, tubular axles, and air brakes. — Talbert Trailers, Inc., 7950 W. 47th St., Lyons, Ill.

Circle 314 on Reader Service Card

To shorten protection time up to 50%

COURTESY OF CATSMAN CO., A LEADING MICHIGAN READY-MIX PRODUCER

...order SOLVAY CALCIUM CHLORIDE in your ready-mix!

Your ready-mix supplier can help you keep your *winter* production close to *warm* weather working schedules. Order "Special-Winterized" mix, specifying 2% Solvay® Calcium Chloride*, heated water and aggregate.

You'll benefit these eight ways:

(1) Less overtime finishing–faster set. (2) Faster form removal–high early strength. (3) Savings in protection time–up to 50%. (4) Less delay between operations. (5) More safety through extra cold weather protection. (6) 8-to-12% greater ultimate strength. (7) Increased workability. (8) You use *less* water and you get denser concrete–more resistant to moisture and wear.

Allied Chemical

SOLVAY PROCESS DIVISION
61 Broadway, New York 6, N. Y.

SOLVAY branch offices and dealers are located in major centers from coast to coast.

For full details, mail the coupon for your copy of Solvay's 38-page booklet, "The Effects of Calcium Chloride on Portland Cement." It presents the results of tests of calcium chloride in standard portland cement mixes, cold weather concreting, special cements and major compounds of portland cement. Text is non-technical, and abounds with easy-to-follow tables, graphs and charts.

*Speeds but does not change the basic action of portland cement. This use of calcium chloride is approved by Portland Cement Association, American Concrete Institute, Calcium Chloride Institute, leading highway departments.

SOLVAY PROCESS DIVISION 28-120
Allied Chemical Corporation,
61 Broadway, New York 6, N. Y.

Please send without obligation Solvay's 38-p. booklet, "The Effects of Calcium Chloride on Portland Cement."

Name_____

Position_____

Company_____

Phone_____

Address_____

City_____ Zone____ State_____

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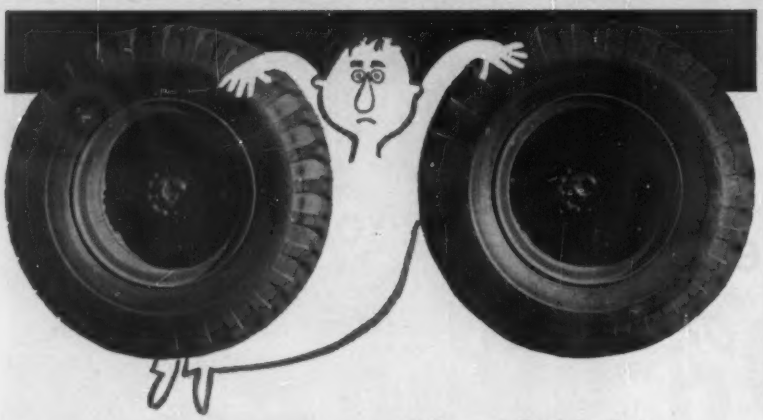


NEED A BACK-UP ALARM?

Call your Bullard distributor he has a mechanical one — that works better, is less costly, easier to install, and takes no maintenance. Pick up your phone right now, or write for literature.

BULLARD
INDUSTRIAL SAFETY EQUIPMENT

E. D. BULLARD COMPANY
SAUSALITO, CALIFORNIA

Circle 124 on Reader Service Card

MONARCH power hydraulic controls lift and lower snow plows automatically!

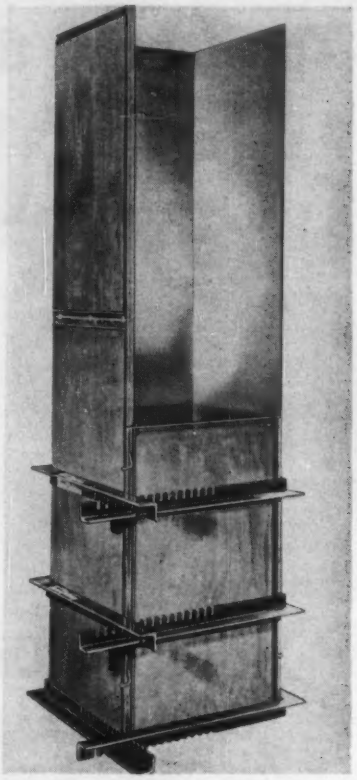
Be sure your equipment is equipped with Monarch units — makes snow removal jobs faster, easier, more economical. One man controls the plow right from the cab . . . instant up-and-down action with the flick of a wrist. A Monarch control can be quickly installed. See your dealer. *Send for free folder today.*

MONARCH ROAD MACHINERY COMPANY
1331 Michigan St., N.E. Grand Rapids 3, Michigan, U.S.A.

Circle 153 on Reader Service Card

EQUIPMENT NEWS...

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

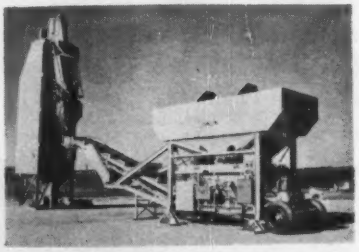


Square Column Forms

Three basic parts are all that's needed to form up square concrete columns. The Deslauriers forming system includes column panels, form clamps, and keys.

All column panels are faced with galvanized, rust-proof steel. And Econ-O-Clamps and keys permit quick assembly of the forms. — Deslauriers Column Mould Co., Inc., 5036 W. Lake St., Chicago 44, Ill.

Circle 315 on Reader Service Card



Transit Mix Batch Plant

Two separate units—one for aggregate and one for cement—make up the Rover mobile transit mix batch plant. Each unit

is equipped with running gear, and the wheels remain attached during operation. Highway travel without special permits is possible because the units are only 8 ft wide and 13 ft high. During moves, the charging hopper and batcher on the cement unit remain attached. When the unit is erected, the hopper and batcher hinge into position over the discharge hood. The plant produces from 100 to 120 cu yd per hr.—C. S. Johnson Co., P.O. Box 71, Champaign, Ill.

Circle 316 on Reader Service Card

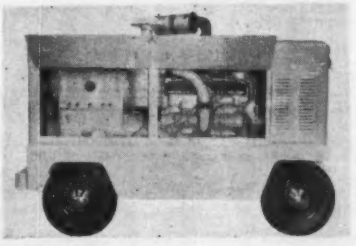
All-Wheel-Drive Trucks

Equipped with standard front axle, International's Model R-210 4x4 truck is rated at 39,000 lb gvw. The 6x6 Model RF-210 has a 49,000-lb gvw rating. With optional front axles, the gvw ratings can be increased to 42,000 and 52,000 lb respectively.

Standard engine on both models is the 6-cyl, 182-hp International RD-450. A 212-hp, 6-cyl unit is optional. Both engines can be equipped with a factory installed lpg fuel system.

Wheelbases for the R-210 range from 148 to 196 in. On the RF-210 they range from 168 to 214 in.—International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

Circle 317 on Reader Service Card

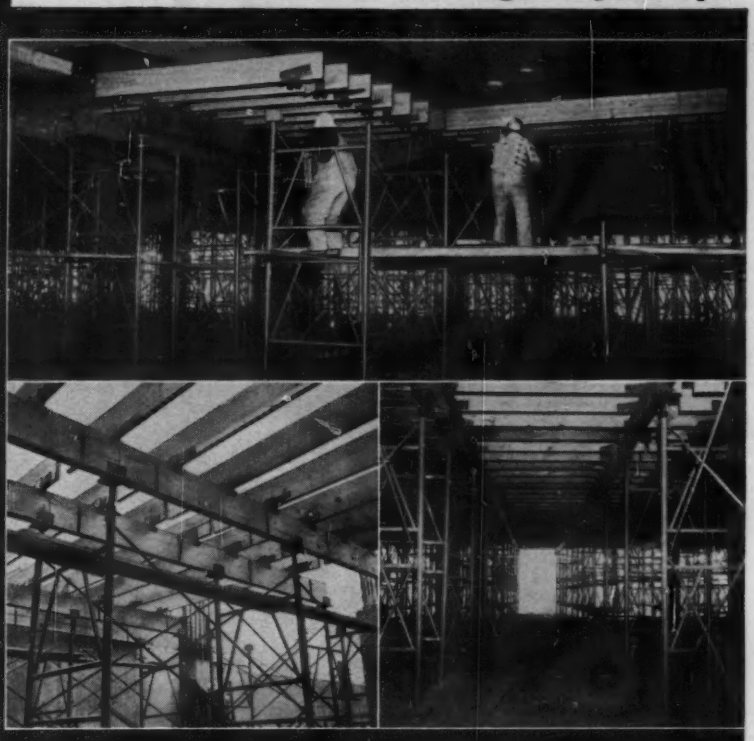


Big Compressor

Powered by a 763-cu in. Cummins diesel engine, the Model 600 RP delivers 600 cfm at 100 psi. It is available on skids or on a four-wheel trailer. The trailer-mounted version weighs 8,800 lb and measures 79x92x141 in.—Davey Compressor Co., Kent, Ohio.

Circle 318 on Reader Service Card

here's DOUBLE shoring capacity!



SAFWAY HEAVY DUTY FRAME SHORING

carries loads on 50% fewer frames; cuts erection and dismantling time

CARRYING up to 20,000 lbs. per frame, this equipment has *twice the capacity* of standard steel frame scaffolding. Thus any given load can be supported on *half as many frames* . . . with corresponding savings in assembly and dismantling time, transportation and storage. Also, heavier beams, slabs, roofs, etc., can be shored safely at virtually any height.

LOAD DISTRIBUTION—Frames carry 10,000 lbs. on each vertical leg—or 5,000 lbs. per leg plus 10,000 lbs. on high load-bearing top horizontal.

FEW PARTS—Only 3 frame sizes with screw jacks meet all job height requirements.

PRECISION HEIGHT ADJUSTMENT—With heavy duty screw jacks at the top, bottom or both.

TOOL-LESS ASSEMBLY—Frames mount on coupling pins; cross-braces mount on studs with wing nuts.

SAFWAY

SAFWAY STEEL PRODUCTS, INC.
6228 W. STATE ST., MILWAUKEE 13, WIS.

WRITE FOR BULLETIN 1112A

Circle 125 on Reader Service Card

EQUIPMENT NEWS...

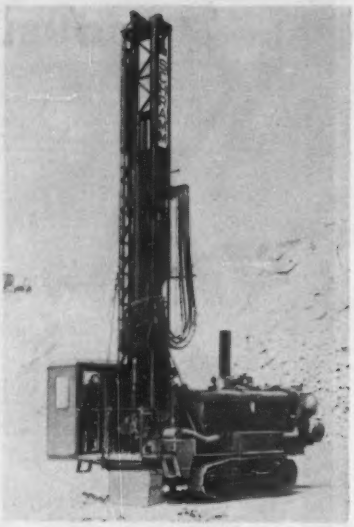
For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

Vacuum Control Operates Tail Gates

A lever can be attached to the steering post or dashboard to control tail gates on dump trucks. The Velvac control operates on engine vacuum and is specially designed for trucks equipped with hydraulic brakes. Tail gates equipped with this control can be opened gradually where controlled dumping is required.

The Velvac vacuum tail gate control kit includes a four-way metering hand valve, a vacuum power cylinder, and the necessary couplings, nipples, elbows, and clamps. The hand valve in the No. 30C-V33X kit can be attached to the steering post or the dashboard. Multiple controls also are available for use on batch trucks to control individual batch boards. —Velvac, Inc., 3534 W. Pierce St., Milwaukee 3, Wis.

Circle 319 on Reader Service Card

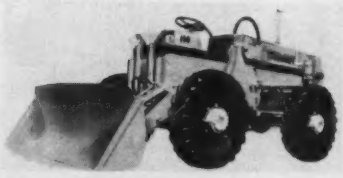


Crawler-Mounted Drill

All controls are grouped on a platform in the operator's cab permitting one man to control all drilling and maneuvering on the Schramm C66 Rotadrill. Operating functions are hydraulically powered. A variable speed motor powers the top drive rotation head, and individually controlled gear boxes drive each crawler track. Hydraulic rams in the mast can exert up to 28,000 lb of down pressure. The C66 is equipped with its own compressor delivering 600 cfm at 100 psi.

A choice of two masts is available. The shorter unit has a 25-ft travel and drills holes to a depth of 100 ft. The taller mast, with a 35-ft travel, can drill to 150 ft.—Schramm, Inc., 900 E. Virginia Ave., West Chester, Pa.

Circle 320 on Reader Service Card

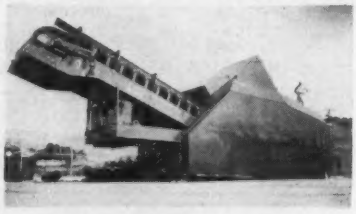


Big Tractor Shovel

Weighing in at 24,500 lb, the Trojan 254 tractor shovel lifts 15,000 lb and handles 2 to 3-yd buckets. Overall length of the rig is 20 ft, and width over the axle hubs is 8 ft 10 in.

Either gasoline or diesel power is available, and maximum road speed is 24 mph. Power shift, power steering, and air-powered hydraulic brakes are standard equipment. A variety of attachments is offered for the 254.—Trojan Div., The Yale & Towne Mfg. Co., Batavia, N.Y.

Circle 321 on Reader Service Card

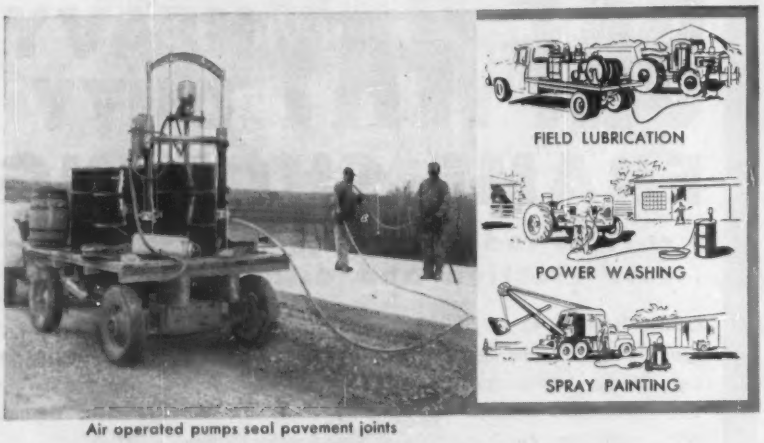


High-Capacity Belt Loader

It takes two men 2 hr to put the 64,000-lb Wescon belt loader into operation. It is capable of loading 3,500 tph. Its 60-in. belt runs continuously, eliminating starting loads, and is powered by a 75-hp Schrock motorized pulley.

The discharge gate and feeder are hydraulically operated and electrically controlled. For transportation, the unit is equipped with tandem dual wheels; a fifth wheel hitch is under the discharge end and can be hooked up to a truck easily.—Western Conveyor Co., P.O. Box 357, Boise, Idaho.

Circle 322 on Reader Service Card



Air operated pumps seal pavement joints

AIR OPERATED PUMPS

Clear the Way for Extra Profits

See for yourself . . . less expensive —lower installation cost—pump from original drums—infinite control of speed—seal material from dirt—completely empty drum . . . With these features Graco equipment gives you more work for less money even on the toughest jobs. From the lightest to heaviest of materials there's a pump for every purpose . . . mastics, plastics, paint, chemicals. For complete information on pumping equipment that meets your needs . . . send us your requirements.

GRACO

GRAY COMPANY, INC.
1246 Graco Square • Minneapolis 13, Minnesota
(See phone book yellow pages "Lubricating Devices" for Graco Suppliers)

Circle 126 on Reader Service Card

Mack diesels get more jobs done in less time. Macks last longer, with less downtime —a most important consideration in the concrete-mixer field. That's been the experience of Denver's Pre-Mix Concrete whose B-61 Model Mack is shown here ready to deliver concrete on an addition to a sewage treatment plant in Aurora, Colorado.

MACK for over 7 straight years NO. 1 by far in sales of diesel trucks

In Denver—concrete means Pre-Mix and Pre-Mix means MACK

Where there's big concrete work in the vicinity of Denver, chances are good you'll find Pre-Mix Concrete Co. and its fleet of Mack trucks on the job. Since buying its first Mack gasoline-powered six-wheeler, Pre-Mix has purchased over 50 more—the most recent being 10 diesel-powered units.

Why is Pre-Mix changing to Mack diesel? Because its Thermodyne® diesel engine operates on one-half the fuel costs of other trucks, hauling payloads of up to 30,000 lbs. over mountainous terrain with grades up to 12%, as well as on congested city streets. They average a legal 55 mph in highway travel and really get up and go in city traffic.

Other major Mack diesel advantages reported by Pre-Mix are greater dependability . . . far better performance . . . much less routine service . . . and complete driver satisfaction.

Mack has the right mixer or dumper for your operation, too. Ask your Mack branch or distributor for the names of satisfied operators, like Denver's Pre-Mix Concrete Co., who have discovered the economy and endurance of Mack trucks for themselves. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

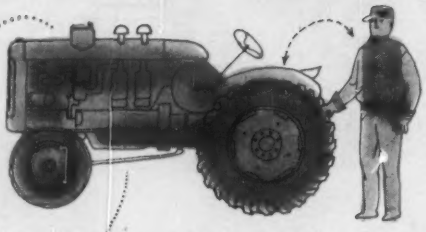
MACK
FIRST NAME FOR
TRUCKS

Circle 127 on Reader Service Card

LOOK AT YOUR SAVINGS WHEN YOU DRIVE A SCHRAMM PNEUMATRACTOR
(Self - propelled Compressor / Tractor)

1 you get

this 125 cfm Compressor



on a husky unit that doubles as a tractor

one man does the work... and drives!

2 you drive

compressed air anywhere fast

and you drive it along with any job!

3 you stop

towing (no more trucks, crews tied up)

pushing (and the cost each time they push)

lost time (while men wait for compressor)

YET YOU PAY LESS for a hard-working 2-in-1 Schramm 125 cfm Pneumatractor than for most anyone else's portable compressor alone!

Cost competitive diesel portable 125 . . $5,945
Cost Schramm Diesel Pneumatractor . . $5,725
Savings . . $ 220

Write for Catalog 5945. And see your nearest Schramm Dealer listed in the Yellow Pages.

Schramm PNEUMATRACTORS
Self-propelled Air Compressors
604 North Garfield Ave., West Chester, Pa.

Schramm, Inc., manufacturers of Rotadrills (Pneumatractor Mounted, Truck Mounted, Crawler Mounted), Air Compressors (Portable, Stationary), Self-propelled Air Compressors (Pneumatractors) and Booster Compressors

Circle 128 on Reader Service Card

EQUIPMENT NEWS...

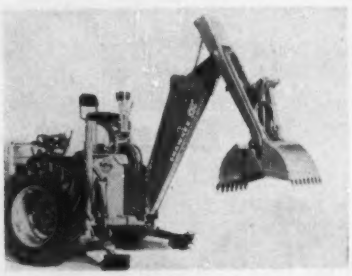
For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

Rear Dump Haulers

Two models have been added to the L-W Haulpak line of trucks, first introduced a year ago (CM&E, May 1959, p. 210). The new trucks incorporate the same design features introduced last year. These include the Hydrair suspension system that eliminates axles and springs, a steering system that is protected above or within the truck's frame, and a body that is heated by exhaust gases circulating through box-section supports.

The smaller of the new trucks is the Model 42. It is powered by a 430-hp turbocharged Cummins V-8 diesel engine and has a top speed of 47.7 mph. The Model 60 is powered by a 550-hp turbocharged Cummins V-12 diesel. Top speed is 46.6 mph. Both models are equipped with Allison Torqmatic transmissions. — LeTourneau-Westinghouse Co., 2301 NE Adams St., Peoria, Ill.

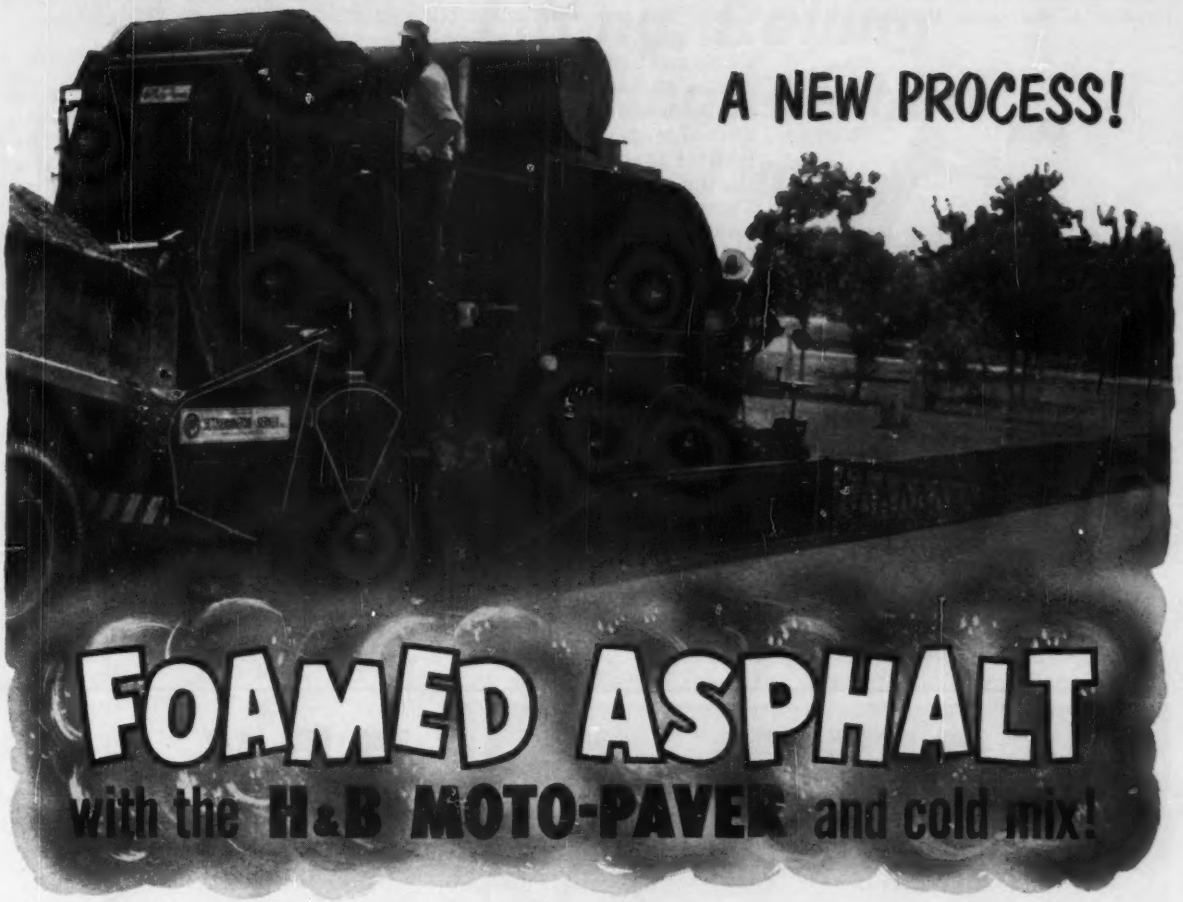
Circle 323 on Reader Service Card



Clamshell Backhoe

Hydraulically actuated clamshell-type excavators in place of backhoe buckets now are available for utility tractors. The Parsons-Shawnee 88C Hydro-Clam attachment handles 24, 30, or 36-in.-wide buckets. It develops a 10,000-lb breakout force and can lift 3,000 lb. Digging depth is 12 ft, dumping height is 9 ft 9 in.— Parsons Co., Newton, Iowa.

Circle 324 on Reader Service Card



HERE'S HOW!

Asphalt, prior to being combined with aggregate, is reduced to a *foam* through the action of steam via a special jet-type nozzle. The foamed asphalt evenly distributes throughout the mix. As it is rolled, the foam dissipates and the asphalt reverts to its natural state. Benefits and advantages are many. For example . . .

NO WAITING FOR CURING

Compaction by rolling *immediately* after spreading.

ASK FOR DETAILS about this NEW OPTIONAL FEATURE ON MOTO-PAVER, H&B's combination *Traveling* Mixer and Paver.

TOWER TYPE BATCH PLANTS in 8 sizes
MOBILE TYPE BATCH PLANTS in 6 sizes
BASE STABILIZER PLANTS in 2 sizes
MOTO-PAVER, the travelling combination Mixer and Paver (cold mix)

Cable Address: Panmakina

HETHERINGTON & BERNER INC.
A Wholly Owned Subsidiary of American Hoist & Derrick Company
Engineers Manufacturers
701 KENTUCKY AVE. • INDIANAPOLIS 7, IND.
Export Dept.: 205 W. Wacker Drive, Chicago, Illinois

Circle 129 *on Reader Service Card*

EQUIPMENT NEWS...

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

Hydraulic Backhoe

The Ware 800 Hydro Trencher has been specifically designed for use on the Oliver 880 industrial wheel tractor. Capacity of the hoe is 9/16 yd, and it develops a breakout force of 10,400 lb. Maximum reach is 21 ft 11 in. All controls for bucket and boom are hydraulic. — Oliver Corp., 1420 Mayflower St., Harrisburg, Pa.

Circle 325 on Reader Service Card

Rock Reducer Has One Moving Part

A rotor cage is the only moving part in the Pulvo-Matic rock reducer. The cage rotates and hurls rocks against stationary breaker plates and against other rocks reducing their size until they are small enough to fall through a discharge opening. The size of the product is controlled by regulating the rotating speed of the cage. Three models of Pulvo-Matic units range in capacity from 10 to 250 tph.—The Frog, Switch and Mfg. Co., Box 431, Carlisle, Pa.

Circle 326 on Reader Service Card

Blasting Agent

Special mixer trucks operating from distribution centers will deliver a new blasting agent, called Propex, to users throughout the country. The nitro-carbo-nitrate blasting agent also is available in 50-lb bags. It consists of ammonium nitrate prills and an oil. —Chromalloy Corp., 120 Broadway, New York, N.Y.

Circle 327 on Reader Service Card

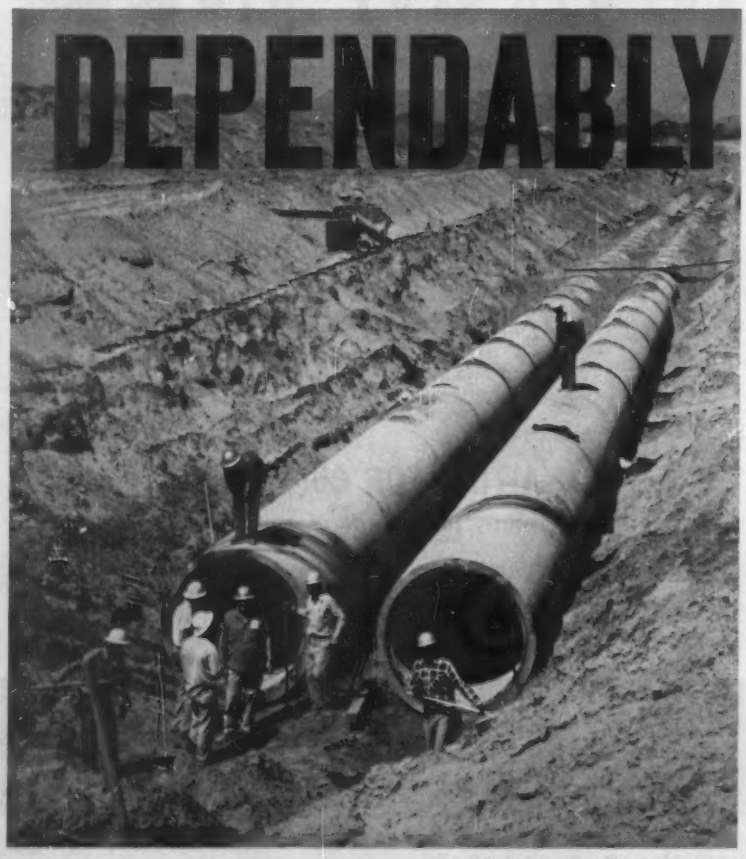
Twin-Engine Scraper

Two drive axles, each powered by separate engine, give this scraper good traction for self-loading. The all-wheel drive Euclid TS-14 is rated at 14 yd struck or 20 yd heaped.

Total engine horsepower is 296. Each of the GM 4-71 engines drives into an Allison Torqmatic drive consisting of a torque converter and a four-speed, semi-automatic transmission. An air-assist remote control and power shift help make the operator's job easy. A no-spin differential is standard on both axles.

All scraper operations are hydraulically and independently controlled. The ejector is of the positive roll-out type.—Euclid Div., General Motors Corp., Cleveland 17, Ohio.

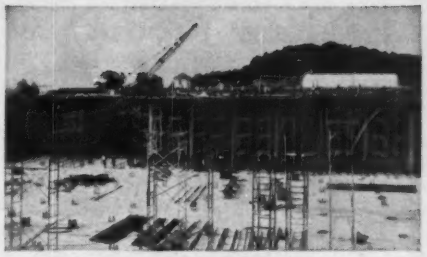
Circle 328 on Reader Service Card

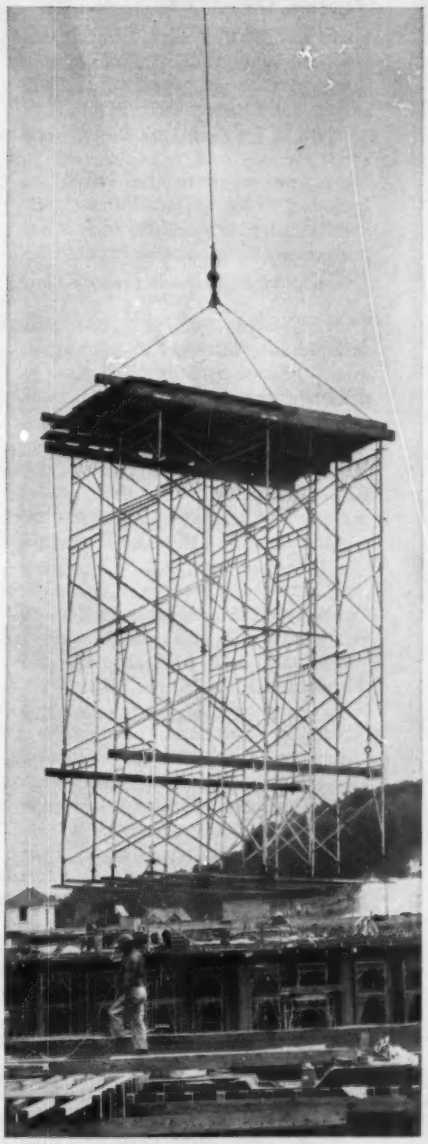


Being able to count on your dewatering equipment means many things. It means the job well done, it means time saved, it means accurate bids, it means profit for you. Dealing with Stang, you have just such assurance: that your water-handling job, no matter where, or what type, will be done and done right — by Stang.

JOHN W. STANG CORPORATION
Engineers and Manufacturers of Dewatering Equipment
8221 Atlantic Avenue, Bell, Calif.
Omaha • Tulsa • Minneapolis • St. Petersburg
Mobile • Tacoma

Circle 130 on Reader Service Card





LIFTING of shoring from tank to tank is rapidly accomplished by crane.

ROLLING is provided by PS Co. hydraulic shoring dollies.

Lifting, Rolling Shoring Method Saves Time

A MINIMUM number of "Trouble Saver"® Sectional Steel Shoring frames are used for this entire job—enough for about ¼ of the roof area of one of two 300′ dia. water tanks at Provin Mt. Reservoir, Feeding Hills, Mass.

By rolling, lifting, and again rolling only this amount of shoring from pour to pour in both tanks, joint venturers, Fruin-Colnon Contracting Co. and C&C Construction Co., are saving considerable time and equipment costs.

As pour areas are completed, 13′ x 15′ "Trouble Saver" Shoring sections with formwork in place are lowered on adjustable screw legs. PS Co. hydraulic shoring dollies are moved beneath these sections which are then rolled, as shown, to new pour areas in each tank.

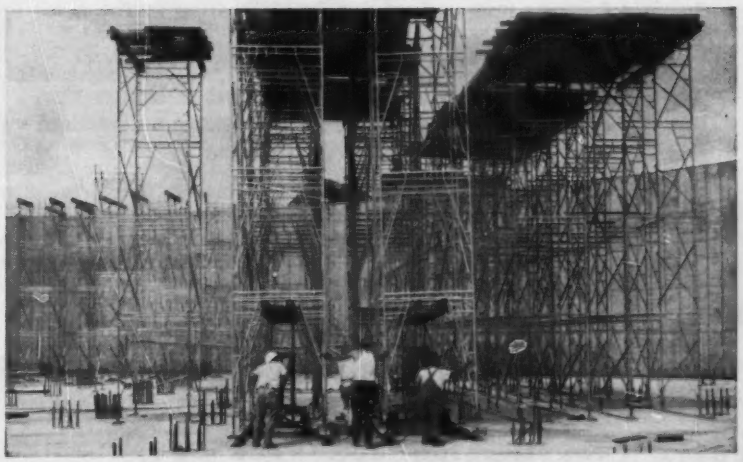
Crane lifts shoring in 13′ x 15′ sections, with all formwork attached, from the completed first tank, swings around to the adjacent second tank, lowers the sections to the concrete floor. The dollies then roll the sections into position.

This project again illustrates the extreme versatility of "Trouble Saver" Sectional Steel Shoring. The easy-to-handle "prefab" end frames are rapidly assembled to form basic, free-standing units with practically any frame spacing required. Sectional units lock atop one another to form towers.

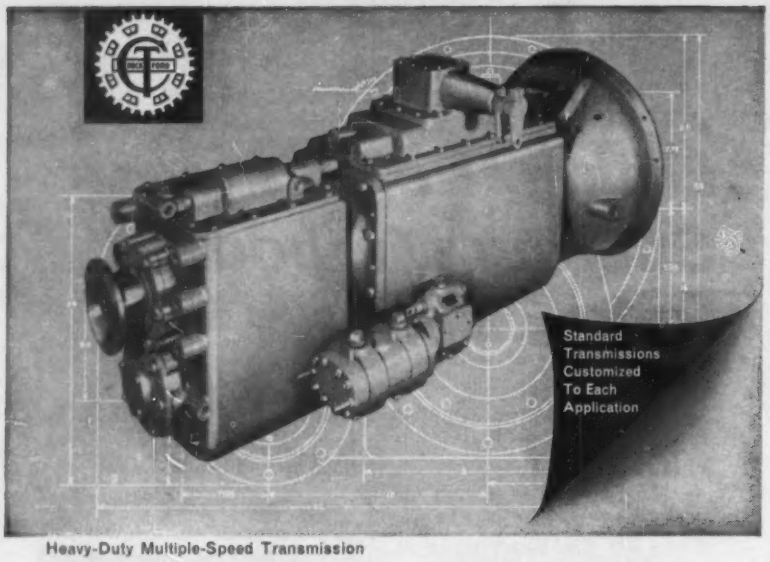
PSCo SCAFFOLDING • STEEL SHORING • SALES • RENTALS

THE PATENT SCAFFOLDING CO., INC.

38-21 12th Street, Dept. CM&E Long Island City 1, New York
1550 Dayton St., Chicago 22 • 6931 Stanford Ave., Los Angeles 1
Branches in all principal cities
IN CANADA: Canadian PS Co., 329 Dufferin St., Toronto



Circle 131 *on Reader Service Card*



Heavy-Duty Multiple-Speed Transmission

Cotta heavy-duty transmissions match high-speed engines to big-machine production

Balancing 2300 - 2400 rpm engines for best heavy equipment production is all in a day's work for Cotta heavy-duty transmissions. Why? Because Cotta transmissions are especially engineered to handle the severe shock loads common in today's big-machine operations.

Extra-wide gears absorb 150 - 2500 ft-lb input torque loads of drilling rigs, power shovels, rock crushers, and mining equipment. Large, multiple-spline connections on alloy steel shafts eliminate stress points and provide maximum concentricity of gears.

±.0005" tolerances aid efficiency

At least 400 to 500 inspections of each gearbox help maintain tolerances to ±.0005". That accuracy won't wear off — even after long, tough use! Closely spaced gear ratios provide the variable speeds required on vigorous big-machine production. And, hand assembly of all Cotta transmissions provides the dependability and efficient performance that pumps, generators, locomotives, off-highway trucks, and similar equipment demand for long hours of trouble-free operation in the field.

Diagrams sent free on request

See our Catalog No. 3a /Co in *Sweet's Product Design File.* Check the detailed descriptions and specifications on standard and custom applications. Then call Cotta (TWX-RK 7720 or phone WO 4-5671) for details.

COTTA
HEAVY-DUTY TRANSMISSIONS

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS

Circle 132 *on Reader Service Card*

New Product Briefs

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

Space Heaters

Forced-air, oil-burning HY-LO salamander weighs 33 lb, costs $50. Burning rate adjusts from 70,000 to 125,000 Btu per hr.—Scheu.

Circle 329 *on Reader Service Card*

Operating on kerosene or No. 1 fuel and 110 v ac, the Model 120-Vented circulates 1,885 cu ft of hot air per min. — Champion Mfg.

Circle 330 *on Reader Service Card*

The Insto-Hot No. 1412 floor type salamander burns LP gas; produces 150,000 Btu per hr; has no pressure regulator.—Insto-Gas.

Circle 331 *on Reader Service Card*

HY-LO gas heaters produce 85,000 Btu. Manually controlled model weighs 21 lb; safety pilot model weighs 22½ lb.—Scheu.

Circle 332 *on Reader Service Card*

Capacity of Model H-3 is 350,000 Btu per hr. It is available with a thermostat, low fuel shutoff, and flame detector.—White Mfg.

Circle 333 *on Reader Service Card*

Output of the S1000 is 1 million Btu per hr at a rate of 7,000 cu ft of air per min. It burns kerosene or No. 2 fuel oil.—Stow.

Circle 334 *on Reader Service Card*

Model H-2 produces 80,000 Btu and operates 20 hr on one tank of fuel. A thermostat is available for automatic operation.—White Mfg.

Circle 335 *on Reader Service Card*

Manual control Penguin costs $26.50, unit with pilot light sells for $36.50. Both burn LP gas, deliver 85,000 Btu.—C. R. Daniels.

Circle 336 *on Reader Service Card*

Two models, rated at 350,000 and 80,000 Btu per hr, burn kerosene, No. 1, or No. 2 fuel and operate on 110 to 120 v ac.—John Wood.

Circle 337 *on Reader Service Card*

Output of the HY-LO salamander is 70,000 to 140,000 Btu per hr on ½ to 1 gal of fuel oil. The 5-ft-high unit costs $22.50.—Scheu.

Circle 338 *on Reader Service Card*

HOT WATER PLANT delivers 1,600 gph with 50-deg temperature rise or 800 gph with 100-deg rise. Portable, coil-type plant is self-contained and available with LP gas or kerosene burner.—Aeroil.

Circle 339 on Reader Service Card

UTILITY TRAILER, Model TD-6, is mounted on a spring and walking beam suspension and rated at 6 tons. The flooring is 2-in. longitudinal fir and oak, and the deck measures 6½x14 ft.—Talbert.

Circle 340 on Reader Service Card

DOZER BLADE for Cat D6B is 8 ft. wide. To reduce overall width, push arms are mounted between the tracks and engine and attached to ball-type trunnions welded to heavy steel brackets.—Balderson.

Circle 341 on Reader Service Card

RADIO SET includes microphone antenna, cables, and fittings. Fob price for 12-v unit is $395. The 15-w VHF-FM set converts from single to multi-channel operation. —Aeronautical Electronics.

Circle 342 on Reader Service Card

WINCHES made of interchangeable standard components come in 24 models to fit customers' specs. Capacities are 500 to 30,000 lb, with electric, air, gasoline, or hydraulic power.—Stanspec Corp.

Circle 343 on Reader Service Card

BARRICADE extends to 8 ft when in use and retracts to 11 in. for storage. Legs are made of steel tubing, cross members of channel. Red flags are standard; flashers optional.—Albert W. Pendergast.

Circle 344 on Reader Service Card

UTILITY PUMP for petroleum products is driven by ¼-hp, 115/230-v, 60-cycle ac motor and delivers about 12 gpm. The basic model of the Series 75 pump is designed for skid tank use.—John Wood.

Circle 345 on Reader Service Card

TWO-WAY RADIO for frequencies of 150 to 174 megacycles is available for 6, 12, or 24-v dc mobile service or for 117-v ac fixed station service. The G-150 set measures 5x8½x12½ in.—Gonset Div.

Circle 346 on Reader Service Card

STARTING FLUID INJECTOR is push-button actuated from dash-mounted control. The Model E700 operates on 6, 12, or 24 v, injecting ether base diesel or gasoline engine starting fluid.—Phillips Mfg.

Circle 347 on Reader Service Card

GAR-BRO helped cut costs in pouring concrete piers!

One contractor cut the time in placing concrete on this bridge job by planning ahead. Here, on these two bridge piers, note that he used three complete units comprised of Gar-Bro Collection Hopper and a string of Steel Chutes plus a Gar-Bro Bucket. He used the hopper and chutes to direct the concrete into the forms and prevent segregation.

His object was to prevent any delays by using one hopper and chute unit to place concrete in one pier, while the second one was set in place in the other pier, and the third one (see it hanging in rack between piers) was being shortened. Delays of transit mixers and the crane were minimized by rotating the hopper and chute units and shortening the chute line to the new level of the concrete in each pier.

It's a good idea to team up your Gar-Bro Concrete Handling Equipment to save time and cut costs.

See your Gar-Bro dealer or write for Catalog and Concrete Handling Manual today!

Gar-Bro Mfg. Co. — Los Angeles, Calif.—Peoria, Ill.

General Offices: 2415 E. Washington Blvd., Los Angeles 21, Calif.

GAR-BRO

The World's Most Complete Line of
CONCRETE HANDLING EQUIPMENT

Circle 133 on Reader Service Card

Radio control keeps everyone on the go by keeping drivers in the know!

What caused your last work stoppage? Could it have been prevented by radioing your foremen and supervisors the exact job condition—letting them send their trucks directly to areas where materials or equipment were needed immediately? How much time and money would you have saved? Take your own work. How much time can radio save you in conferring, checking, planning, and trouble shooting?

Ask a nearby Motorola 2-way radio user. Learn firsthand how you and your foremen can become more productive—saving miles and minutes with each 2-way radio message.

Why Motorola? You get highest dollar value! 1. A custom-planned system engineered to your specific requirements—Motorola assumes complete responsibility for your system. 2. The right equipment—from the world's most complete line of communications tools—Motorola has thousands of installations in every conceivable type of vehicle. 3. Unmatched reliability, proved by the majority of the nation's utilities, police, fire and transportation services—the professional buyers of 2-way radio. 4. Motorola service by factory-trained technicians from nearby maintenance centers—keeps your system at factory peak performance for long-lasting service and satisfaction. These are some of the reasons Motorola outsells all other makes combined!

Call your local Motorola Factory Sales Engineer—or write today to see how 2-way radio can most profitably serve you. For companies with operations abroad—Motorola sales and service are available in 50 countries throughout the world.

MOTOROLA 2-WAY RADIO

Motorola Communications & Electronics, Inc., 4501 Augusta Blvd., Chicago 51, Ill. • A Subsidiary of Motorola Inc.

Circle 134 on Reader Service Card

Welding Saves Frozen Tractor

ON-THE-SPOT WELDING salvaged a crawler tractor frozen in mud on an Omaha construction site. A new three-step welding process for cast iron was used to repair the tractor's final drive housing. The process speeds cast iron repairs because it eliminates slow cooling of each pass and permits welding under difficult conditions.

Millard Heating & Mfg. of Millard, Neb., handled the repair job. It became necessary when a sudden three-day storm caught a contractor's small tractor in deep mud at an excavation site. The mud was frozen solid, and the contractor feared that the tractor would become hopelessly mired when the ground thawed out.

So he promptly attempted to drive the tractor out under its own power, but the machine wouldn't move. And application of full power in low gear ruptured the cast iron final drive housing on the right rear side where the sprocket drive shaft emerges from the gear case. Several pieces broke off and left a triple-forked break.

With the temperature on the rise, it was important to get the tractor out. But equipment was not available to tow it out, nor could a new casting for the 10-yr-old tractor be obtained quickly enough. Field welding became necessary to repair the tractor so it could be driven out.

Millard's ace welder was put to work in a wooden lean-to, and a fire was built to give him some relief from the weather. Then he hacked away the frozen mud, located the broken-off pieces, and tack-welded them into place.

As the first step in the repair weld, a vee-shaped groove was channeled out along the path of the break. This was done with Eutectic's chamfering electrode, ChamferTrode. The vee-shaped groove breaks up stress concentrations at the weld. A chamfering electrode is normally recommended for this step under any conditions, but it was particularly useful here because a power grinder would have been difficult to utilize.

FINAL DRIVE HOUSING—Chalk marks indicate field welds that were made to save a frozen tractor. A three-step welding process for cast iron was used in the repair.

Next, the welder coated the vee area with a thin layer of material deposited with EutecTrode 27 electrode. It seals the wet, grease-impregnated cast iron surface and prevents contamination and porosity in the final weld deposit. This step permits welding of gears, housings, and other parts that have been exposed to dirt and contaminants which would otherwise interfere with good deposits.

The third step involves a new electrode developed by Eutectic. The QuenchTrode 24 electrode makes a deposit that does not crack when quenched. Many cast iron welds require slow cooling of the deposit placed by each pass, and the deposits crack if quenched or cooled too rapidly by air.

QuenchTrode was used to fill the vee and to attach the broken pieces to the final drive housing. A backstepping technique with 2 to 3-in.-long individual beads was utilized for this operation. Each bead was quenched with a wet rag immediately after depositing and then peened. As soon as the job was completed, the tractor was driven out under its own power.

Advertisers' Literature

Listed below is free material offered in this issue's advertisements received up to Oct. 15. To get the items you want, circle appropriate numbers on the SERVICE CARD inside the back cover.

SHORING—Bulletin 110A describes heavy-duty frame shoring in three frame sizes that carries up to 20,000 lb per frame.—Safeway.

Circle 360 on Reader Service Card

HYDRAULIC CONTROLS — Folder tells how truck operators can lift and lower snow-plow attachments from the truck cab.—Monarch.

Circle 361 on Reader Service Card

MOBILE DRILL— 4-p brochure gives full details of the high-speed Apache mobile drill designed for truck or tractor mounting.—Mobile.

Circle 362 on Reader Service Card

SCREED SUPPORTS — Catalog 700 covers metal-base and chair-base screed supports for use on steel or plywood decks.—Superior.

Circle 363 on Reader Service Card

CUTTERS — Catalog illustrates a complete line of more than 100 hand and hydraulic cutters for cutting metal.—H. K. Porter, Inc.

Circle 364 on Reader Service Card

CALCIUM CHLORIDE—Effects of calcium chloride in winterizing portland cement concrete are given in a 38-p booklet.—Allied Chemical.

Circle 365 on Reader Service Card

TRACTOR SHOVEL — Data on the 300-hp Model H-120 Payloader that handles buckets from 3¾ to 8 yd is available.—Hough.

Circle 366 on Reader Service Card

METAL CONDUIT—How an 18-ft-dia corrugated metal drainage structure replaced an old bridge is discussed in a full report.—Armco.

Circle 367 on Reader Service Card

PUMPS—A complete line of AGC rated pumps and dependable Mud Hog diaphragm pumps are fully covered in Bulletin C-09.—Marlow.

Circle 368 on Reader Service Card

COMBINATION UNIT—The Pneumatractor, a self-propelled 125-cfm compressor doubles as a tractor. Details in catalog 5945.—Schramm.

Circle 369 on Reader Service Card

CONCRETE FINISHING — A folder, Steel Trowel Finishing of Air-Entrained Concrete, presents many helpful on-the-job tips.—Alpha.

Circle 370 on Reader Service Card

DRILL—Spec sheet AT-147 details the truck or crawler-mounted LRD-3 rock drill for up to 7⅞-in.-dia holes to 100 ft deep.—LeRoi.

Circle 371 on Reader Service Card

DRILL—Information is available on the Mole-Dril that screws directly onto the drill pipe and works right at the rock face.—Gardner-Denver.

Circle 372 on Reader Service Card

CONCRETE INSERTS—Bulletin No. 6 gives complete data on types, sizes, working loads, and uses of an expanded line of inserts.—Richmond.

Circle 373 on Reader Service Card

STARTED WITH 1 PRIME-MOVER

NOW OWNS 19 PRIME-MOVERS

THE STANDARD CONSTRUCTION CO., INC.

MINNEAPOLIS provides its laborers with the power to produce. PRIME-MOVER is made specifically for laborers' use — to triple their output in handling of materials. Here is an immediate and positive way to cut costs. Why not do as this alert contractor is doing? Give your laborers the power to produce. Write for job estimating data and performance reports.

A PRIME-MOVER places from 12 to 17 cubic yards per hour on the average pour.

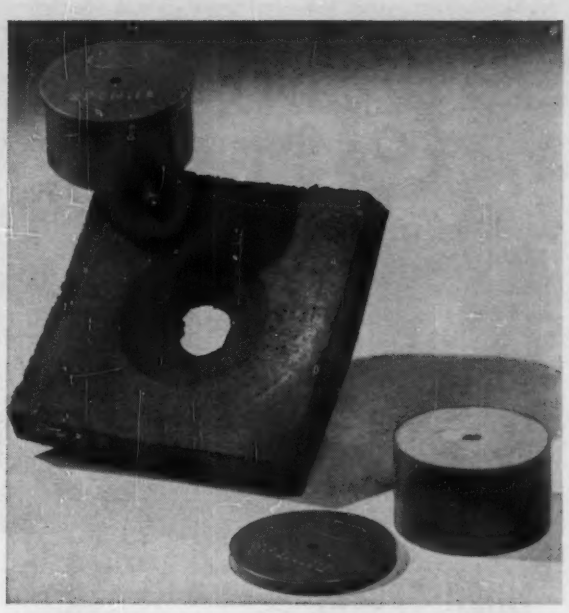
THE PRIME-MOVER CO.
PRIME-MOVER
MUSCATINE, IOWA

Circle 136 on Reader Service Card

Help Fight TB

Use Christmas Seals

Extra easy to load, you simply thread the new SPENITE Explosive Boosters on detonating cord. Knot holds Spenite boosters in place when cord is lowered in hole.



The hole blasted in this inch-thick steel plate is dramatic proof of the energy developed by the new SPENITE booster. Read about it below:

New Spencer Development Slashes Cost Of Boostering Ammonium Nitrate-Fuel Oil Blasts

Advanced high-efficiency booster called SPENITE* is first material specifically designed for use with this low-cost explosive

Pioneers in money-saving ammonium nitrate-fuel oil explosives, Spencer Chemical Company now introduces SPENITE—a revolutionary new boostering material that cuts blasting costs even further!

Spencer SPENITE Boostering material is specially formulated to detonate ammonium nitrate-fuel oil mixtures. By developing the best blast characteristics of this economical explosive, SPENITE offers two important advantages:

1. SPENITE cuts explosive costs by lowering the cost of detonating materials and reducing the number of boosters required per hole.
2. SPENITE provides maximum blast efficiency by generating more intensive explosive heat.

This remarkable discovery is based on test results which indicate that for efficient boostering of ammonium nitrate-fuel oil mixtures, the heat which the booster generates is more important than the velocity of the detonation. Explosive heat generated by the SPENITE booster is at least 50 per cent greater than with other commercial boosters.

Package is specially-designed, round plastic containers, SPENITE boosters can easily be threaded on 50-grain detonating cord at desired intervals. The hole can then be filled with Spencer N-IV Ammonium Nitrate-fuel oil mixture, stemmed, and shot in the conventional manner.

Free technical assistance is available from Spencer to acquaint you with the cost-cutting advantages of new SPENITE boostering material and Spencer N-IV Ammonium Nitrate as well. Mailing this coupon now can guide you to big saving on blasting materials.

*SPENITE is a trademark of Spencer Chemical Company.

SPENCER

Spencer Chemical Company, Dept. IAN
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☐ Spencer N-IV Ammonium Nitrate.

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Circle 137 *on Reader Service Card*

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Equally at home on the rolling plains or in rugged hill country . . . wherever *fast, economical* down-the-line erection of power lines, guard rails, fences and similar installations is required.

Tough, resourceful ally in the daily skirmish for profits. Hydraulic powered drill head spears down a full 10′, tilts 4-ways for angle boring or vertical boring on slopes.

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Circle 138 *on Reader Service Card*

New Publications

These catalogs and bulletins from manufactuers contain useful information about construction equipment and materials. To obtain a copy of the items you want, circle the appropriate numbers on the READER SERVICE CARD just inside the back cover.

DRAGLINE BUCKET—Brochure DH-30 presents details of the dual-hitch automatic dragline bucket that can be easily adjusted to dig at any depth above or below the fairlead with equal efficiency. — Page Engineering Co., Clearing P.O., Chicago 38, Ill.

Circle 348 *on Reader Service Card*

DETONATING FUSE — A 72-p pocket-size manual covers six standard brands of detonating fuses for commercial blasting. It also describes approved operations in priming, loading, and hooking up Primacord for instantaneous and delayed firing. — Ensign-Bickford Co., Simsbury, Conn.

Circle 349 *on Reader Service Card*

ROLLERS—Separate descriptive sheets present data and specs on four different models of tandem rollers ranging from 1 to 4 tons. Another sheet gives details of the Model VR-28-R vibrating compactor.—Essick Mfg. Co., 1950 S. Santa Fe Ave., Los Angeles 21, Calif.

Circle 350 *on Reader Service Card*

CRANE—A 20-p catalog (2988) describes the new 25-ton HC-77 truck crane that weighs 56,000 lb, is 8 ft wide, and handles an 80-ft boom and 40-ft jib.—Link-Belt Speeder Corp., Sixth St. S.W., Cedar Rapids, Iowa.

Circle 351 *on Reader Service Card*

DRAINAGE PIPE—The installation of perforated corrugated steel pipe for subdrainage is described in a catalog. Included is a description of a new line of wedge fasteners that speed pipe installation and reduce material cost.—Armco Drainage & Metal Products, Inc., 9360 Curtis St., Middletown, Ohio.

Circle 352 *on Reader Service Card*

BORING UNIT—A 6-p bulletin covers the KA-MO E300, an electric powered boring unit with a boring range that varies from 40

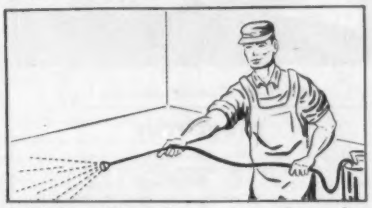
ALPHA news and notes from the field

BETTER CONSTRUCTION THROUGH BETTER USE OF CEMENTS

Tips on Finishing Air-Entrained Concrete

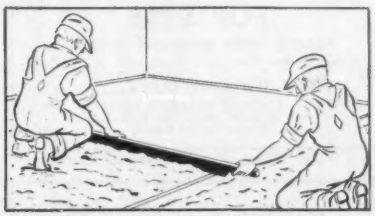
Concrete made with air-entraining cements differs from regular or non-air-entrained concrete in that it contains millions of minute, completely separated air bubbles. It was developed to produce concrete that would resist the effects of freezing and thawing. It also improves workability; results in less bleeding or surface water; less segregation; and has less tendency to dust when steel trowel finished.

Steel trowel finishing of air-entrained concrete requires slightly different techniques to prevent pulling or tearing of the concrete surface. To determine these specific differences, Alpha engineers, with the assistance of experienced finishers, ran a series of practical tests. These conclusions resulted:

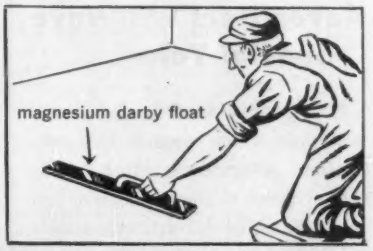


1. Moisten the grade to prevent absorption of water from the mix.

2. Wheel, shovel or chute mix into place—do not flow.

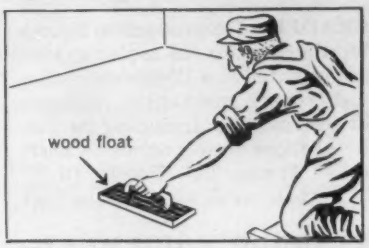


3. Level and tamp into place with strike-off screed.



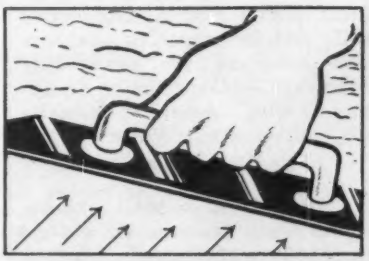
4. Delay wood floating for 30 to 40 minutes after the concrete is placed. If stickiness appears when wood floating is started substitute a magnesium darby float—use sparingly and in a flatter position than for regular mixes.

...or



4-a. If the wood float is used, steel trowel sparingly in about 10 to 20 minutes after the wood floating is completed. Don't overtrowel. If stickiness appears, delay troweling for 15 or 20 minutes or until stickiness disappears.

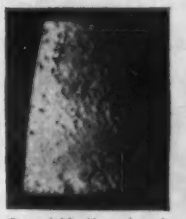
5. Give final steel troweling when thumb pressure barely dents the concrete surface.



6. Final troweling compacts the surface, leaves it smooth. The trowel produces a ringing sound but not as noticeable as with regular mixes.

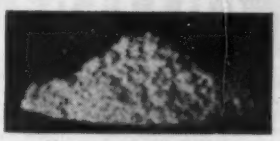
7. Start curing as soon as possible without marring the surface. Use waterproof paper, curing compounds, wet burlap or ponding with water.

A Stiff Mix is Easier to Finish



Good if vibration is used.

Maximum slump for air-entrained concrete.



Too wet—will make air-entrained concrete sticky.

Don't use a wetter mix than is necessary for satisfactory workability. New mixes should always be tested before use on jobs because air-entraining cements and admixtures perform differently with different materials.

There is no great difference in finishing air-entrained concrete compared to regular mixes except that care must be taken not to overtrowel concrete in the early stages. This causes tearing and stickiness. A stiff mix is much easier to finish than a wet one. The air bubbles in the concrete impede the passage of fines and water to the surface so there is less danger of dusting caused by overtroweling or overfloating. However, there is more danger of a soft surface if the curing step is not carried out. Alpha experiments proved that when considerable pressure is used in the final steel troweling, a harder wearing surface will result.

More Information

Write for a copy of the Alpha Craftsmanship in Concrete folder: "Steel Trowel Finishing Air-Entrained Concrete".

ALPHA

PORTLAND CEMENT COMPANY

Alpha Building, Easton, Pa.

Circle 139 on Reader Service Card

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There's a HAND or HYDRAULIC powered PORTER CUTTER to answer your toughest metal-cutting problems — over 100 different cutters, all designed to save you time, labor, and money! Make short work of cutting:

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CUT up to ¾" rods with HAND OPERATED TOOLS — up to 1⅜" rods and 2½" power cable with POWER OPERATED TOOLS.

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Somerville 43 Mass

Circle 140 on Reader Service Card

NEW PUBLICATIONS . . .

For more information, circle the key number found at the end of each item on the READER SERVICE CARD, which is just inside the back cover.

ft of 48-in. dia hole to 240 ft of 12-in.-dia hole at any angle.—Kwik-Mix Co., Div. of Koehring Co., 235 West Grand Ave., Port Washington, Wis.

Circle 353 on Reader Service Card

GRADER—Job production figures for the Cat No. 14 motor grader are reported in a 12-p booklet that also covers mechanical features of the machine, including its turbo-charged diesel engine.—Caterpillar Tractor Co., Peoria, Ill.

Circle 354 on Reader Service Card

SANDHOG EQUIPMENT—Shields, locks, grouters, tunnel cars, and a tunnel excavator are illustrated in a 4-p bulletin (No. 23-a).—Mayo Tunnel and Mine Equipment, Lancaster, Pa.

Circle 355 on Reader Service Card

HEATER—Specs and data of the Little Giant salamander that burns L-P gas, butane, or propane are covered in a descriptive sheet. The heater has a 50,000 Btu/hr capacity.—Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N.Y.

Circle 356 on Reader Service Card

ROAD BUILDING—Bulletin 1003 (8-p) covers eight basic methods of stabilization in building roads. It describes additives and equipment used for stabilizing native soils and in preparing the base and subgrade for heavy-duty highways. — Construction Equipment Div., American-Marietta Co., Milwaukee 1, Wis.

Circle 357 on Reader Service Card

DUMP TRUCK — Mack's 30-ton dump truck powered by a 6-cyl diesel 320 to 380-hp engine is covered in a 4-p brochure. The booklet describes component parts of the new M-30X four-wheel 4-wheel end-dumper chassis, and includes specs. — Mack Trucks, Inc., Plainfield, N.J.

Circle 358 on Reader Service Card

JIG—Bulletin J2-B10 (B-p) provides data and specs on the Wemco-Remer jig for removing undesirable material from fine aggregate and sand.—Western Machinery Co., 650 Fifth St., San Francisco 7, Calif.

Circle 359 on Reader Service Card

SEARCHLIGHT SECTION

(Classified Advertising)

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Methods Memo

Three-Wheel Hauler Goes Anywhere

Having trouble going through snow, swamps, muskeg, or over water? This rig may be just the thing to take you there. It rides on three cylindrical wheels 10 ft 4 in. in dia and travels over any terrain and floats in water. Weldon Appelt, a Houston engineer, designed the rig and named it the Trailbreaker. He plans to put it into production soon, and he hopes to sell it to businesses engaged in construction, exploring, mining and other activities in the Canadian Northwest and Alaska.

The Trailbreaker can carry a 10-ton payload when floating and an even greater load on land. The rig's two front wheels drive the unit, while the rear wheel guides it. Two gasoline or diesel engines, delivering about 350 hp each, power the drive wheels through roller chain drives. Speeds range from 1½ to 12 mph depending on the terrain. The rig can climb a 35% grade, and with a winch it can pull itself up a 60% grade. For traveling while afloat the wheels are equipped with blades that act as paddles, or a propeller can be installed.

Reinforcing Doubles as Heating Element

Welded wire fabric serves both as reinforcing and as a radiant heating element for a concrete floor in a 6,500-sq ft service center and warehouse of the Northern States Power Co., Minot, N.D.

Concreting the floor slab was a two-stage operation. First, the general contractor, Mackley Construction Co. of Minot, placed 2 in. of 3,000-psi concrete over a polyethylene vapor barrier on a fill. The electrical contractor, Holmes Electric Co, moved in to place the wire fabric and make the electrical connections as soon as the concrete was set. Then a 4-in. top course completed the floor.

Special care had to be taken to install the wire fabric, make the electrical connections, and insulate the electrical system in the floor. To make the fabric serve as effective reinforcement, sections of it had to be overlapped to insure continuity. But to maintain the proper flow of current, the overlapping lengths had to be separated electrically. Carefully placed ½x2-in. strips of Transite do the job here.

To apply electrical potential to the reinforcing, ¼x3-in. copper buss bars are welded across the full width of each section of fabric. At one end of the fabric the buss bars are 5 ft long, at the other end they're 9 ft 10 in. long and bridge two adjacent strips of mesh. This makes the current flow from the transformers, through the floor in a U-shaped pattern, and back to the transformers. Concreting on top of the wire fabric is done with extreme care to prevent displacement of the reinforcing and damage to the insulation.

Six transformers power the heating system. The potential applied at the transformers is 208 v; at the wire it is 20 v. The wire fabric is designed to emit 20 w per sq ft of floor in the warehouse and 15 w per sq ft in the office and shop.

Glue Joins Steel Pipe

Welding steel pipe may no longer be necessary because glue can be used to join sections of pipe. A new technique developed by Tex-Tube, Inc., of Houston utilizes special bell-joint pipe, an epoxy glue, and a patented crimping tool. The glue is applied to the mating surfaces before they are joined, and the crimping tool holds the joint firmly until the epoxy sets. It attains maximum strength in about 48 hr. Tex-Tube also manufactures the special pipe to go with the process. The pipe is available in sizes from 1½ to 6⅝ in. in dia.

Contractor Harnesses Rat Power

Work on an irrigation system at Grants Pass, Ore., presented the crews with the tough task of having to string wires through a 147-ft-long section of 2-in. conduit. A stranger to the construction industry—a white rat—was hired to help.

A special harness with a string attached to it was fitted on the rat. The wee beastie was placed in the conduit and left there over night. The men were sure the animal would make the one-way trip because rats can't travel backward.

Sure enough, the rat pulled the string through the conduit. And with the string, crews were able to put 13 electrical wires in place with ease. Fee for the rat's services: $6.

TO

"FASTEN ONTO SOMETHING GOOD"

(OR TO DRILL IT OR CUT IT)

KNOW THE MAN WHO CAN SHOW YOU HOW

Specifically, for multiple fastening in building and construction with metals of all kinds . . . and for fastening to, drilling or cutting concrete, it pays to know the man from OMARK.

He not only offers you a variety of systems for doing such work. He also brings you experienced on-the-job counsel, and an engineering service to help you specify exactly the right equipment for doing the job, rapidly, dependably and economically.

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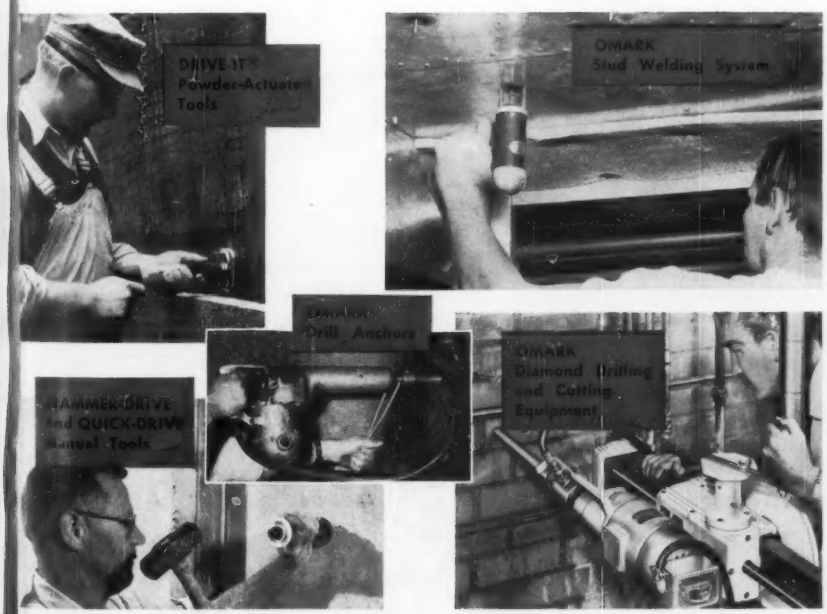
Fastening, Drilling and Cutting Equipment For Building and Industry



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Case® Terraload'r® digs without "bucking"... 16 Timken® bearings take the loads, buck costs

VERSATILE as a one-man band, this Case W-9 Terraload'r digs, maneuvers and dumps heaped payloads fast and easy. Its balance and stability enable it to do tough digging without "bucking". And it has up to 40,000 lbs. of crowding power for fast digging, a lift capacity of 11,000 lbs. To *roll* all the loads, give long bearing life, the Terraload'r has 16 Timken® *tapered* roller bearings at vital points: in planetary axle, pinion, differential, wheels, and rigid and steering axles.

Here's why Case and every major construction machinery manufacturer uses Timken bearings:

1) *They're tapered.* The tapered construction of Timken bearings lets them take any combination of radial and thrust loads. And they give *extra* load-carrying capacity because of full-line contact between rollers and races.

2) *They're Timken bearings.* Case and other companies know they get more for their money when they buy Timken bearings. More in service from graduate engineer-salesmen, more in research and testing facilities, more in quality. Timken bearings are made from the finest bearing-quality alloy steel available.

Timken bearings have been making construction machines better for 42 years. Make sure the machines you buy or build are equipped with Timken tapered roller bearings. They make good machines better. ***When you buy Timken bearings you get . . .*** *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) Pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ontario.

Industry rolls on

TIMKEN®

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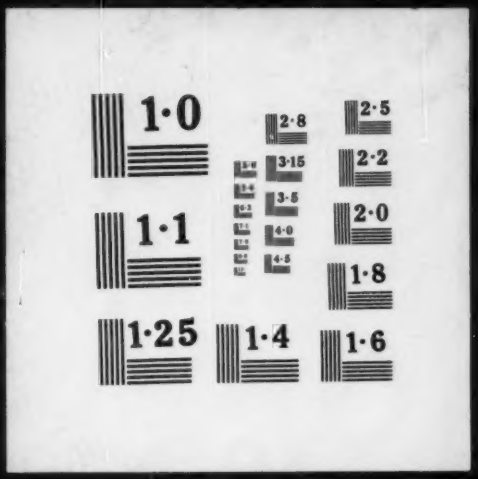
RESOLUTION CHART



100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and $100/20 = 5$.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and $7.9 \times 5 = 39.5$ lines per millimeter recorded satisfactorily. $10.0 \times 5 = 50$ lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.

THE END